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CHRONIC
FATIGUE INTOXICATION

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✓ CHRONIC FATIGUE INTOXICATION ✓

*A Heretofore Inadequately
Described Affection ✓*

By

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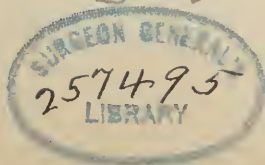
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TO THE
MEMORY
OF MY HONORED TEACHERS
PROFESSORS JAMES NEVINS HYDE
AND
FRANK HUGH MONTGOMERY
WHO FIRST AROUSED MY INTEREST IN THE DIFFICULT,
THE OBSCURE, AND THE UNKNOWN IN MEDICINE
THIS LITTLE VOLUME IS GRATEFULLY DEDICATED
BY
THE AUTHOR

PREFACE

Very early in my medical experience I became impressed with the fact that occasionally patients complain of certain symptoms which do not seem to fit anywhere into the known classification of diseases. As my medical horizon widened I found more and more of these apparently detached manifestations of deviations from the normal, and after more than twenty-five years of careful observation, assiduous search and study, I have been able to piece these symptoms together much as one pieces together the disarranged parts of a puzzle map, and out of it has emerged a perfectly clear-cut symptom complex which I believe is best described by the term Chronic Fatigue Intoxication. This symptoms complex is, I believe, as clearly a disease entity as any we have to deal with in medicine.

He who would go comfortably, efficiently, and worthily through life should know at least something about the way, should know some of the pitfalls and dangers which he is liable to encounter in his journey, and should be able to recognize the more important danger signals.

The purpose of this little volume is, first of all, to point out one of the reefs to be avoided by the traveler as he sails on the still incompletely chartered ocean of life; second, to describe in detail the

signs and symptoms of this disease, in order that it may be more easily recognized and more perfectly understood by the medical profession; and, finally, to outline the treatment which has been successfully employed to relieve scores of these sufferers, in order that others may make use of the same method, thereby restoring to happy, contented, useful citizenship the many who because of this affection have become incapacitated, and thus, for a certain per cent of individuals at least, push back in time the infirmities of premature old age.

THE AUTHOR.

Chicago, March, 1923.

CONTENTS

	PAGE
PREFACE	5
CHAPTER	
I. INTRODUCTION	9
II. ETIOLOGY	12
III. SYMPTOMATOLOGY	19
A. General Symptoms	19
B. Skin and Appendages.....	21
C. Subcutaneous Areolar Tissue.....	29
D. Muscular System	31
E. Joints	39
F. Gastro-Intestinal Symptoms	42
G. Genito-Urinary Symptoms	46
H. Respiratory Symptoms	48
I. Circulatory Symptoms	50
J. Nervous Symptoms	52
K. Exacerbation	75
L. Age	76
M. Concluding Observations on Symptomatology	77
IV. DIAGNOSIS	79
V. COMPLICATIONS AND SEQUELLAE.....	95
VI. PATHOLOGY	98
VII. PROGNOSIS	109
VIII. PROPHYLAXIS	113
IX. ANIMAL EXPERIMENTS	122
X. TREATMENT	128
XI. CONCLUSIONS	141

CHRONIC FATIGUE INTOXICATION

CHAPTER I

INTRODUCTION

Chronic Fatigue Intoxication is a general, chronic, organic, systemic disorder, the result of the gradual accumulation in the tissues of excessive amounts of fatigue material. It manifests itself symptomatically in a deviation from the normal of practically every function of the body in that reaction is out of proportion to the stimulus acting, by more or less generalized tonic muscular spasm, by an inability on the part of the affected individual to secure physical relaxation or mental repose, and by a very characteristic group of physical signs and symptoms which will be described in detail under the general heading of symptomatology.

Acute fatigue has been studied repeatedly by both physiologists and internists, but so far as I have been able to determine, no exhaustive clinical study has ever been made of chronic fatigue, and consequently this subject has not received the attention that its prevalence in our modern society merits. I do not wish to convey the impression that this condition is numerically or proportionately very prevalent, but since it affects many of our most valuable

citizens, it is nevertheless of rather serious import from an economic and general welfare standpoint. It affects almost exclusively the ambitious, the spirited, and the strong-willed, who from a sense of duty or borne on by their enthusiasm drive their bodies beyond the limit of physical safety and who, before they are aware, have hypersaturated their system with fatigue material to such a degree as to make it impossible for the organism to again rid itself unaided of this toxic substance, and when this has once persisted for any considerable length of time the whole physical, psychic, and moral nature of the individual often becomes so changed, and the judgment so warped, that the individual can rarely get back to normal without outside help.

The sloven, the laggard, the phlegmatic, and the weak-willed are rarely ever affected. It attacks the finest type of men and women usually in middle life, greatly shortens their period of usefulness and their enjoyment of life, leaves them partial wrecks or complete derelicts just at a time when their experience and mature judgment would make them especially useful to the community, state, and nation; it further wracks their later years with pain and suffering and robs the aged of that peace and serenity to which those who have faithfully served their fellow men are justly entitled.

Old age should be just as beautiful as youth. An old geologic formation is usually more rugged and

more fascinating than a young one. A sunset is often more beautiful than a sunrise. Fall and winter are as lovely in their way as is spring. Normal old age has its advantages and compensations just as childhood, youth, and middle age have theirs. If this be true, old age should be as satisfactory as other age periods are. That it is not is a great pity. That altogether too small a percentage of human kind grows old satisfactorily, comfortably, and beautifully must be evident to anyone who is at all observing. In the following pages one of the major causes for this will be considered.

CHAPTER II

ETIOLOGY

Physical overwork or overstress continued for a considerable period of time, which produces waste more rapidly or far in excess of the power of elimination, is the basis for the development of this condition in all cases. It is much more likely to occur if the individual works at a speed in excess of his normal speed or carries a load in excess of his normal carrying power. Each individual has a certain speed and a certain capacity for work at which speed and capacity he can accomplish the most with the least tear on his system. If he exceeds this speed or stress for any considerable length of time he is almost sure to develop this condition. In other words it must not be forgotten that what would be physical overwork for one individual might be a normal task for another. Personal endurance and personal resistance play an important part here as elsewhere. Then again personal endurance and personal resistance vary from time to time in the same individual. Thus it is that during adolescence or shortly after a severe illness an amount of work which would ordinarily be harmless may easily lay the foundation for this affection. Among the causes which I have most

frequently noted as contributory to physical overstrain in the production of Chronic Fatigue Intoxication, I would mention overwork shortly after a severe illness such as typhoid fever, septic infections, puerperal sepsis, rheumatism; continued exposure to befouled, vitiated air in ill ventilated, overcrowded workshops and living apartments; exposure to coal gas and sewer gas. I believe this latter is so very harmful because it makes it impossible for the system to throw off the fatigue material which constantly forms even under normal conditions. I have had a number of cases who were in the habit of sleeping in rooms heated with coal-stoves in which the dampers were shut down during the night; these cases with moderate physical work developed this condition, from which I was unable to relieve them until they moved out of their stove-heated apartments, when they promptly recovered under suitable treatment.

Long-continued, excessive loss of sleep coupled with moderate work as well as excesses of all kinds, such as the excessive use of narcotics and alcoholic stimulants, favor its development. Exposure to extreme heat or extreme cold when oft repeated or continued for long periods of time may be contributory factors.

Whether mental overwork alone will produce this condition or not I am not able to say definitely because in none of the cases of this type which I

have treated and studied was it possible to determine absolutely just what part the mental overwork played and what part might have been due to possible eye strain, because nearly all of the mental overwork cases were compelled to use their eyes a great deal in their study.

That mental overwork and emotional over-stimulation are often contributory causes is quite evident, but whether either one alone or both combined are ever able to produce it, is very doubtful; at least so far as my observation goes, every typical case which I have examined had had physical overwork as its origin.

The foundation for this affection is very frequently laid during the period of adolescence, the years when ambition is apt to run riot and when the wish and the will to do and dare far exceed the physical strength to execute.

One of the most common combinations of causes is the combination of overworking and overeating, overeating when excessively fatigued, or severe exertion on a full stomach. These combinations so alter the end results of digestion that the pabulum which is absorbed acts as a mild poison instead of as a true food.

Ordinarily the body rapidly recuperates from moderately excessive fatigue but if this excessive exertion is persisted in day after day for a considerable period of time and particularly if the

work is done at an abnormally high rate of speed, the point ultimately comes when the system becomes so supersaturated with fatigue material that it is no longer able to rid itself of this excessive accumulation unaided.

The causes which produce this condition can probably be best emphasized by enumerating some of the types of persons most commonly afflicted:

1. Very conscientious and especially brilliant professional men, particularly medical men and social workers, who are anxious to alleviate human suffering and to help correct the many evils and wrongs of our present-day civilization or who see great opportunities in their chosen profession to acquire wealth or to establish great reputations.

2. Brilliant business men, who see great opportunities in the expansion of their business and who work hard all day, consume excessive quantities of highly nitrogenous foods, attend theatres and clubs in poorly ventilated, close quarters in the evenings, consume some alcoholic liquors and use much tobacco, and secure insufficient sleep.

3. Debutantes who are constantly on the go, who consume large quantities of rich confections, especially bonbons, and who dance until the early hours of the morning in unhygienic clothing and in over-crowded, stifling, hot ballrooms. I have known a number of these young women who in this way contracted this affection and who thereby

were invalided for life. If they escape it at this stage they are likely to acquire it during the senseless prenuptial and postnuptial festivities which are now the rage. Should they escape it here also they are very likely to acquire it when they get into the full swing of society again as hostesses who stand by the hour at receptions and at the dressmakers, and who go to fashionable dinners night after night. Society women who strain every nerve to get into a certain set or to maintain themselves there are particularly likely to be thus afflicted.

4. Ambitious college students of moderate means who in addition to their regular class work have to make their livelihood by outside work.

5. Farm boys, who during their years of adolescence are often shamefully overworked.

6. Manual laborers of all kinds, especially day laborers and farmers, and of the latter more particularly renters and farm owners whose farms are heavily encumbered.

7. Pace-makers in our large industrial plants, as well as their less efficient fellow workers who try to keep the same pace, and who strain every muscle and nerve, and who carry burdens that for them are excessive, or who maintain for long periods of time a speed that for them is abnormal, very frequently are victims of this disease.

8. Individuals with uncorrected errors of accommodation, especially hypermetropic astigmatism,

particularly if they are compelled to do much near work, are much more likely to be affected than those with normal or nearly normal vision.

9. Any physical handicap which places the individual at a disadvantage with his competitors in his struggle for existence has a tendency to produce this condition, particularly if one so handicapped is very ambitious and anxious to keep up with his companions. This includes all physical deformities which in any way interfere with physical activity such as anchyloses from whatever cause, as tuberculosis of the hip, knee, spine, ankle, etc.; old osteomyelitis particularly if it has resulted in anchyloses, or shortening or stiffening of joints; unreduced, congenital, and traumatic dislocations particularly of the hips; contractures from burns or other injuries; limitation of joint motion resulting from any of the joint inflammations, as arthritis deformans, rheumatism, etc. A not uncommon handicap and one which is often overlooked is *undersize* and *oversize*; that is, a small person trying to keep up with others much taller than he, or a slight individual trying to keep up his end with much stronger fellow workers, or a very slender tall person trying to work with tools and machinery constructed for the average sized man. Such men are very apt to become over-strained.

10. Business and professional women, especially teachers, private secretaries, department or business

managers, etc., who try to fill the double rôle of bread winner and home maker.

11. The willing assistant of a chief who is not quite big enough for his job, particularly if the chief finds it easier to pile extra work upon the willing helper than to prod up or discharge the lazy ones.

12. The over-conscientious private duty nurse who spends many sleepless nights under great physical and mental stress in seemingly endless vigil with her desperately sick patients.

13. The institutional nurse, particularly the superintendent of nurses who works long hours at high tension among sick patients, in a none too well ventilated hospital, with the dual responsibility of looking after the care of the sick and instructing the pupil nurses, until her strength and vitality become utterly sapped.

14. Finally, and probably most common of all, the over-conscientious mother, especially the farmer's wife, whose work is never done, particularly if, in addition to her many household duties, she has to bear many children in rapid succession and who is constantly urged on by the strongest of all motives, the concern and love for her children.

These many classes and others living under our high-pressure civilization furnish the never-ending stream of recruits which make up the large and ever-increasing army of this type of sufferers.

CHAPTER III

SYMPTOMATOLOGY

A. GENERAL SYMPTOMS

This disease is if anything more protean in its manifestations than is lues. Its symptoms may on occasions simulate a great variety of both chronic and acute affections. But this is not all. In addition a patient suffering from this affection may, like a patient suffering from lues, go through a large gamut of varying symptoms during the progress of his illness, symptoms which apparently bear no relation to each other, and which may even on the surface appear contradictory. As in lues it took centuries to discover the relation between the different stages of the disease, and as in the former it is only within the last two decades that the relationship between the first three stages and the fourth stage was completely worked out, so in this affection the great number and variety of symptoms have made a clear undersanding of the whole rather difficult.

The disease under consideration may conveniently be divided into two stages, namely, the acute, early, active or labile stage and the late, fully developed, chronic, or stabile stage. These two stages while relatively distinct nevertheless gradually merge into each other and the whole symptom complex may be

further obscured and complicated by the acute recrudescences and exacerbations to which the chronic stage is liable at any time. That these two stages are actually part and parcel of the same disease, in spite of their oft seeming incongruity and contradictoriness, can readily be determined if one will carefully study the histories of these cases, study the patients carefully in the different stages, and observe the development of the disease in the horse, the animal most suitable for experimentation along this line, and further if one will observe the retrogression under treatment, for the retrogression is much the same as the development, only that it takes place in the reverse order.

One of the most characteristic symptoms of this condition is the fact that reaction is always out of proportion to the stimulus acting; and this applies with equal force to physical stimuli and physical reactions, and to emotional stimuli and emotional reactions. In the acute labile stage the resultant reaction is out of all proportion in its intensity, while in the chronic stage the reaction is disproportionately sluggish and feeble.

Another very noticeable peculiarity is that as it progresses the area of normalcy in any one field may become very much contracted. Thus, for instance, the reaction to heat or cold may be greatly accentuated. Such a person may feel relatively comfortable at a temperature varying between 68 and 72 degrees

F.; may feel oppressed and begin to perspire profusely on the slightest exertion if the temperature rises to 80 degrees F.; and suffer from chilliness if it drops to 60 degrees F., while a normal person would scarcely be conscious of the fact that the temperature had undergone any variation whatever. This besides being an evidence of hyper-sensitiveness is evidence of the lack of power of quick adjustment to variations in the environment. In the above illustration the heat regulating center responds too slowly while in other instances other centers may react too quickly or too violently. Similar phenomena may occur with any form of stimulation to which the organism may be subjected. In addition the overworked person is less capable of responding to a given demand, in fact the time may come when it is utterly impossible for him to respond to even normal demands; and this applies not only to demands upon his muscles both voluntary and involuntary but to all bodily functions.

B. SKIN AND APPENDAGES

Some of the first symptoms to appear and the last to leave, if the patient is put on proper treatment, and in fact the first ones that attracted my attention in the study of this affection some twenty-eight years ago are dermagraphia, urticaria, angio-neurotic-oedema, and pruritus. Angio-neurotic-oedema and urticaria may involve any portion of

the body though the former is more apt to involve the exposed surfaces of the body such as the face and hands, while the latter is more apt to involve the covered portions of the body. The former is apt to be more permanent and the latter more transitory though the reverse may be the case. I have one patient who had repeated transitory attacks of angio-neurotic-oedema and a number of persistent chronic lesions, one of which had persisted for fifteen years and only disappeared after long and careful systemic treatment. The former is more likely to be unilateral and asymmetrical, and the latter bilateral and diffuse. The dermographia is often a forerunner of urticaria or sometimes follows urticaria as when the patient progresses toward recovery. Herpes labialis is likely to occur in these cases when there has been a period of extra stress. In some of these patients it occurs every time that the patient has over-taxed his strength, or has been exposed to bad air for a number of hours, or has lost considerable sleep.

The pruritis associated with this affection may be localized or general. If the former, it is more likely to affect those portions of the body where the mucous membranes and the skin meet, as the margins of the eyelids, nose, mouth, anus, and genitalia and the palms of the hand and the soles of the feet. In either case it is apt to be difficult to control. In fact, local applications are usually

of little value and often quite futile. I have known a number of patients to die in great agony from the continued harrassment of the itching in spite of the best efforts of a number of expert dermatologists. I know of nothing that is more distressing than a case of general pruritus caused by this affection. In these cases it is practically impossible to find any external cause for the pruritus, and a pruritus which cannot be accounted for by a local cause should immediately make one suspicious of a systemic cause and particularly of this affection. Local pruritus if a part of the general disease is equally intractable and can only be permanently relieved by curing the general condition. It is of course evident that a pruritus of this kind is not really a skin affection, but merely a skin manifestation of a general condition.

Herpes zoster is another not infrequent symptom and if so is more likely to occur during the earlier stages than during the advanced stages, and may even be a premonitory symptom.

Seborrhea sicca and seborrhea oleosa with premature baldness and premature grayness are also quite common and here is to be noted the following interesting fact, namely: that practically the same cause may produce a hypo or a hyper secretion of the oil glands and sweat glands affecting either separately or both simultaneously, making rather strange and varied combinations, as mani-

fested by the seborrhea sicca and seborrhea oleosa and other abnormalities in skin secretion. These conditions again, if a part of the general Chronic Fatigue Intoxication, are quite intractable and are not cured by local treatment until the main cause is first removed. I know of one case in particular of seborrhea oleosa that did not show the slightest improvement under the most skillful dermatological treatment but which subsided spontaneously without any local treatment whatever when the systemic cause was finally discovered and removed. In extreme cases of change in activity of the glands of the skin we may even have a condition described by dermatologists as asteatosis.

In extreme cases of seborrhea oleosa this excessive fat excretion plus the exfoliating particles of epidermis sometimes make little elevation on the skin, particularly the exposed portions of the face and hands. These accumulations usually occur on both halves of the face, in about equal numbers, but not symmetrically distributed, varying in size from two millimeters to one centimeter in diameter; irregular in outline, projecting from one to three millimeters above the surrounding skin. They resemble similar lesions which are sometimes found on very old persons, but I have found these lesions a number of times on middle aged persons and have seen them disappear under suitable general treatment. Trophic changes sometimes also affect the

nails of the fingers and toes, and the hair of the scalp, making both of these excessively brittle. The finger nails often show the longitudinal striations described by Fothergill.*

The skin particularly on the exposed portions of the body such as the hands and face may be overstretched, thin, shiny, dry, almost lifeless in appearance and ashen gray in color, or blue, moist, cold and clammy, or loose and flabby sometimes, on the cheeks and neck, folds of skin form almost simulating whattles; or again the skin is red, florid, hard, dry, and swollen or the complexion may be alternately livid and florid or ashen. If the skin is very dry and lifeless, fissures of various depths and varying degrees of severity may develop. These fissures may occur anywhere but are most likely to occur on the hands and feet about the nares, mouth, arms, groins, genitalia, and anus. They may be very superficial, in which instance the pruritus may be the principal annoyance, or they may be quite deep and cause a good deal of pain and distress. I have seen several patients of this type whose anal fissures had been operated upon without getting any relief whatever, but who recovered entirely upon proper systemic treatment.

On the covered portions of the body the skin is often dry, thickened, roughened, and pigmented. One of my patients, a very cleanly, fastidious woman, had skin on her back and sides of chest

* Fothergill, J. M. *Gout in its Protean Aspects*, pages 37-38.

which in places was fully three-fourths of an inch thick, which felt more like the bark of a tree than skin; in fact, was likened to a grating iron by the patient herself and was so pigmented and black that it looked as though she had not had a bath for weeks and months. Under proper general treatment without any particular treatment for the skin itself this thickening, roughness, and pigmentation disappeared so that in the course of a few months it resumed its normal color and became as soft, thin, and pliable as the skin of a young girl. If the pigmentation affects the exposed portions of the body, particularly the face, it cannot be differentiated from the condition described as Cloasma in the dermatological textbooks, and I think it is identical with it.

In the less severe cases patches of skin are found here and there on the body which are rather difficult to describe. They may vary in size from one or two cm. in diameter to the size of the palm of the hand, and even larger, usually more or less circular though sometimes somewhat irregular, sometimes symmetrical and sometimes asymmetrical. If the skin is picked up between the thumb and index finger it is found to be greatly thickened and glossy, almost as though oil could be pressed out of it, always sensitive and often excruciatingly tender.

A very fine crepitus, much finer than that observed in emphysema, is occasionally met with in

far advanced cases and if it is found and true emphysema can be excluded I believe it is a positive diagnostic sign of Chronic Fatigue Intoxication—at least I have never found it in any other condition. This peculiar crepitus seems to be in the dermis rather than in the subcutaneous areolar tissues. What causes it I am unable to state, but it feels something as one would expect incompletely erupted sudamina to feel, and I am rather inclined to believe that it has some relation to this condition or possibly to an excess of oily deposit in the skin as described in the last paragraph. I have on a number of occasions been able to demonstrate this sign to internes and others. It is one of the first signs to disappear as the patient starts on his road to recovery.

One of my women patients, forty-eight years of age, had still another very peculiar eruption involving the non-hairy portions of the head down to the level of the clavicle. The face was particularly involved. The whole surface was thickly studded with millet sized papules looking something like sudamina, only studded much closer. The depressed areas between the elevations were no larger than the elevations themselves. On magnifying the surface with a hand glass it looked something as a very severe case of smallpox pitting looks without magnifications, with this apparent difference that the depression was the normal and the elevation the

abnormal. These papules had first begun to appear about twenty years previously and had grown steadily worse. Shortly after commencing treatment this condition began to improve and while not quite normal at the present writing, two years after the patient was first seen, conditions have so much improved that she can now go about the street without attracting attention.

On several occasions I have found another peculiar condition, namely, millet seed to barley corn sized purplish tumors of the scrotum, which, in one case at least, aroused the suspicion of the family physician to melano-sarcoma, but which proved to be minute blood tumors which were closely associated with the superficial veins of the scrotum and seemed to be small circumscribed hemorrhages. I have never seen these in any other portion of the body or in any other condition and I am inclined to ascribe them to histologic changes in the wall of the veins or chemical alteration of the blood, or both, as I also do the following symptom occurring in many of these patients, namely a peculiar tendency to bruising by traumata that would be harmless if applied to the tissues of a normal person. A very slight pinch will cause a large ecchymotic spot which will turn yellow in a day or two and remain tender for several days, so that on such an individual from one to many black and blue spots can be found on the body most of the time. This

tendency to bruising disappears entirely as these patients recover, as do also the little blood tumors previously described. I have one patient who had these little blood tumors for a period of at least fifteen years and as he progressed to recovery they disappeared one by one, and at one of my examinations two of them were actually seen by me to be exfoliating.

C. SUBCUTANEOUS AREOLAR TISSUE

This tissue is usually the seat of a diffuse oedema which infiltrates these structures, separates the skin from the deep fascia, and in that way obliterates the normal contour and creases of the body. If this involves the tissues of the face, particularly if associated with thickening of the skin, it often gives the intelligent person a very unintelligent look simulating sometimes the expression of countenance so frequently seen in those habitually indulging in alcoholic liquors to excess; makes the hands look puffy, pudgy, and swollen so that the play of the extensor tendons cannot be seen and the normal depressions are obliterated. The same changes though less noticeable are found in other portions of the body. Thus for instance, if the forearm is divested of clothing and the patient is directed to move his fingers, the play of the muscles and tendons cannot be observed.

Oftentimes there are deposits in the subcutaneous

areolar tissues and intermuscular septa varying in size from a split pea to a black walnut, rather firm, always sensitive, but during acute exacerbation very painful and excruciatingly tender, as sore as a boil, the patients usually say. In fact, in one instance a colleague wanted to incise one of these deposits thinking it was an abscess. In another case where the deposits were less tender a medical adviser urged the excision of a group of these deposits thinking they were tubercular glands. This is another sign which I have never found in any other condition. These deposits will disappear as the condition improves—another evidence that they are an integral part of this affection.

The oedema above mentioned is very hard and does not pit, and besides greatly thickening the skin and subcutaneous tissue it often causes an immobility of the skin, particularly about the deltoids and over the greater trochanters but also over other portions of the body. This immobility of the skin simulates to a striking degree the condition known as "hide-bound" in horses; a symptom in horses which is a part of a general condition very closely resembling Chronic Fatigue Intoxication in man and a condition which can be produced by overwork covering a long period of time or by excessive work on a full stomach for a short period of time. This subject will be further considered in the chapter on Animal Experiment.

D. MUSCULAR SYSTEM

This system is one of the first to be involved and one of the last to get well. Hyperirritability and spasms of both the voluntary and involuntary muscles are the chief manifestations. The contractions may either be simply fibrillary, or tonic spasms of the whole muscle or muscle group. The fibrillary contractions can often be observed in any of the voluntary muscles while making a general physical examination and are often also noticeable, during ordinary conversation with such a patient, in the orbicularis palpebrarum and in the small superficial muscles about the corners of the mouth. In the more severe cases the tonic contracture of the muscle or muscle group is intermittent and brought out only when the muscle is stimulated by mechanical irritation such as handling or gentle tapping, a sign spoken of as myotonia, while in the still more severe cases the muscles are often in permanent tonic spasm not even relaxing completely during sleep. In these severe cases the muscles often feel as hard as a board and there is very little difference in their consistency whether at apparent rest or when a voluntary attempt is made at further contraction. In other words, they are always at greater tension than normal.

An individual whose muscles are chronically bilaterally contracted and who cannot relax them and make them flaccid at will is almost sure to be

suffering from this condition. The only exception I can think of is Little's disease. This chronic contraction may involve every voluntary muscle, in which case it usually results in marked limitations of both active and passive motion and often makes the patient assume very peculiar attitudes and characteristic facial expressions.

A patient in whom the neck muscles are thus involved walks with his neck stiff, the head thrust slightly forward and often a little to one side, with a peculiar shuffling gait which is so characteristic that it can often be diagnosed as he walks into the room. If the larger neck and trunk muscles are involved the patient has difficulty in bending and stooping and if unexpectedly subjected to even a slight push may have great difficulty in recovering his equilibrium, and in the aggravated cases may be unable to do so, depending upon the direction of the push, but may fall backwards or forward unless caught. This symptom known by the term *propulsion* may be the first warning of the oncoming paralysis agitans which in the great majority of cases at least, I am inclined to think, is not a disease in itself but simply one of the terminal stages of this affection. If the tonic spasm involves the facial muscles very characteristic expressions of the face develop. Thus, if the risorius muscles are principally involved the patient often has a chronic grin, though he may not feel a particle like laugh-

ing. If the corrugator supercilli are principally involved he bears a constant frown and looks as though he were suffering from a chronic grouch. If the depressor anguli oris are involved the corners of the mouth are pulled down and he has the expression commonly known as "down in the mouth." If both the last mentioned groups of muscles are simultaneously involved the patient usually looks as though he had just buried his last friend. In other words, the facial expression of these patients is rarely natural and relaxed. It is much more likely to be a meaningless grin, a listless stare, or an exaggerated chronic grouch.

If the masseter muscles are involved the patient has difficulty in opening his mouth, and I have seen one case at least that on superficial examination had been diagnosed as beginning tetanus. If the levator labii superioris and alaeque nasi are affected, a peculiar thick fold on either side of the nose develops. Sometimes the lips become tightly drawn giving a peculiar thin-lipped expression to the face. If all of these facial muscles are affected, as sometimes happens in the severe cases, the patient acquires a very heavy and sometimes stupid look.

The large skeletal muscles often become very tender after long periods of this tonic contraction and patients suffering from this affection almost invariably complain of what they call muscular rheumatism. Sometimes a single muscle is thus

involved and can be anatomically outlined because of its tonicity, swelling, and extreme tenderness. This may subside and another muscle become affected. It is interesting to observe here that whenever these muscles are thus contracted one can find deposits varying in size from millet seeds to split peas in the tendons of origin and sometimes also in the tendons of insertion of the affected muscles. Insofar as my experience goes, these do not entirely disappear until the patient has made a complete recovery. As stated before, any, and in fact all, of the skeletal muscles may be involved either simultaneously or at some time or other during the progress of the disease, and I have found practically every skeletal muscle affected in one or another of my patients, and the above described deposits will then be found either in the tendon of origin or insertion, or both, of every one of the muscles thus involved. In my experience, however, the most common locations for these deposits are the following: (I enumerate them not in the order of their greatest frequency but begin at the head and proceed downward on the body.)

1. The origin of the temporal muscle, namely the temporal fossa and the temporal ridge.

2. The points of origin and insertion of the sterno-cleido-mastoid both at its sterno-clavicular origin and its insertion on the mastoid and the superior curved line of the occipital bone.

3. The remainder of the superior curved line, particularly the origin of the trapezius, and below this the insertion of the complexus muscle.

4. The insertion of the trapezius muscle on the outer third of the posterior border of the clavicle, the acromion and the superior lip of the crest of the spine of the scapula.

5. The origin of the deltoid, the outer third of the anterior border and the upper surface of the clavicle, the acromion process and the lower lip of the posterior spine of the scapula and its insertion on the rough prominence on the middle of the outer side of the shaft of the humerus. This, by the way, is one of the most common points of tenderness and one of the most difficult to permanently relieve.

6. The insertion of the latissimus dorsi on the inner lip of the bicipital groove of the humerus.

7. The origin of the scapular head of the triceps just below the glenoid cavity.

8. The tip of the coracoid process where the common tendon of the short head of the biceps and the coracobrachialis takes its origin.

9. The point of insertion of the biceps in the bicipital tuberosity of the radius.

10. The common tendon of origin of the pronator radii teres, the flexor carpi radialis, the palmaris longus, the flexor carpi ulnaris, the flexor

sublimis digitorum which springs from the internal condyle.

11. The common tendon of the extensor communis digitorum, the extensor minimi digiti, extensor carpi ulnaris, the aconeus, which tendon is attached to the external condyle of the humerus. These last two deposits occur in practically all cases of writer's cramp and in pianists and violinists suffering from overwork. They are absolutely typical, hard to relieve, but when completely relieved the patient promptly recovers.

12. The point of insertion of the flexor carpi ulnaris.

13. The point of insertion of the flexor carpi radialis.

14. The numerous points of origin of the pectoralis major muscle on the clavicle, the sternum, and the costal cartilages.

15. The point of insertion of the pectoralis major on the anterior bicipital ridge of the humerus.

16. The point of origin of the rectus abdominis on the crest of the os pubis, and the symphysis pubis.

17. The points of insertion of the rectus abdominis on the cartilages of the fifth, sixth, and seventh ribs. These are very frequently points for deposits to occur and if on the right side the one on the cartilage of the seventh rib is sometimes mistaken for gall stone tenderness.

18. Occasionally there is a very small tender deposit in the costoxiphoid ligament at one or the other, or both, sides of the ensiform cartilages. This probably occurs when the rectus abdominis muscle has four instead of three points of insertion.

19. Any one of the numerous points of origin and insertion of the muscles and tendons comprising what is often spoken of as the spinal complex to the spinous and transverse processes of the vertebrae.

20. The crests of the ilia where many of the large trunk muscles and some of the thigh muscles have their origin.

21. The points of origin of the tensor vaginae femoris and the sartorius muscles, on the anterior part of the outer lip of the crest of the ilium and the anterior part of the superior spinous process.

22. The point of insertion of the obturator internus, gemelli, pyriformis, gluteus minimus, on the tubercle of the femur.

23. The point of insertion of the gluteus medius on the posterior lip of the great trochanter.

24. The point of origin of the semitendinosus, semimembranosus, and the biceps on the tuberosity of the ischium.

25. The points of origin of the gastrocnemius on the internal and external condyles of the femur.

26. The point of insertion of the ligamentum patellae on the tubercle of the tibia.

27. The point of origin of the soleus from the

head of the fibula and the upper third of the posterior surface of its shaft.

28. The point of insertion of the tendo achillis on the posterior surface of the os calcis. This spot is sometimes mistaken for an inflamed synovial bursa.

Of these muscles and tendons the ones by all means the most frequently affected are the pectoralis major, trapezius, deltoids, spinal complex, muscles of the fore-arm, and calves of the legs. The latter two often become so hard that it is quite impossible to indent them. In the severer cases they never relax and remind one of the condition described by athletic directors as glass arm. Though less sensitive and painful as a rule, they are just as hard and remain permanently so unless relieved after many months of the most painstaking treatment.

The spasm in the early stages may make the muscles appear as though they were actually hypertrophied but on more careful study it will be found that this is really only a pseudo-hypertrophy. As the disease progresses, the pseudo-hypertrophy is often replaced by marked muscular atrophy, at first only involving single muscles or groups of muscles and later all the skeletal muscles.

The muscle spasm produces many secondary symptoms. After a period of rest the patient finds it difficult to get started. Then after a short period

of activity he catches his second wind, as it were, limbers up somewhat, but his muscles remain unsteady, not completely under the control of his will, somewhat shaky, and without the ability for fine co-ordination. This can be observed in the various movements of the patient, in his handwriting, and particularly in the modulations of the voice. These patients after the slightest exertion and even under very moderate excitement will find their voices suddenly going into a high falsetto or again become throaty. This peculiar lack of control of the voice is a symptom often observed among prominent men suffering from this condition and is quite distinct from what we speak of as being "stage struck."

E. JOINTS

With almost all cases, even in the early ones and always in the late ones, there is some joint involvement which is very characteristic and has been described in different textbooks under various headings such as chronic arthritis, arthritis deformans, chronic rheumatism, rheumatoid arthritis, and Heberden's Nodes, depending somewhat upon the point of view of the author and upon the size of the joint involved. Many of the joint involvements thus described are really only parts of the general disease under consideration. This process may involve only one or two joints or it may involve

every movable joint of the body, is insidious and gradual in its development, sometimes remaining stationary for months only to flare up again, and may take years before fully developed. Some fifteen years ago I saw such a patient with beginning joint involvement who saw fit not to take my advice, went to a number of physicians, finally drifted into the hands of Christian Scientists, back again to regular practitioners, and when I saw her ten years later she was absolutely helpless, completely bedridden, and finally died from this affection.

The joints involved are usually irregularly enlarged, often the swelling is in lumps, and this peculiarity is quite characteristic of this condition. Later in the disease the swelling may be more diffuse, but on careful inquiry it is usually possible to elicit the information that the swelling began at one point and remained localized for a considerable time before becoming general. At the time of examination the swellings may or may not be tender or painful but on the occasion of acute exacerbations which occur from time to time, they puff up, feel hot to the touch, become reddened and more tender and painful. As the disease progresses, motion becomes more and more interfered with. The stiffness is not due to a true ankylosis, for except in the terminal cases extension and flexion can be accomplished almost or quite to the normal

extent by gentle, slow, passive motion. The involvements seem to be confined entirely to the periarticular structures, namely tendons, ligaments, and capsules. I have never come across a case, and I have examined dozens of them, where either the bone or the cartilage was involved in a pathological process so far as I was able to determine and at no time have I found free fluid within the synovial sac. The degree of swelling is often very pronounced and the swelling sometimes so firm that on a number of occasions patients have been very positive in their belief that the bone itself must be the seat of the trouble, but in these cases the x-ray showed no such involvement and the swelling always disappeared on proper treatment. The most typical and easily studied joints of this kind are the smaller joints, the type now generally called Heberden's Nodes, which Heberden described under the heading "Digitorum Nodi." Heberden's description is so perfect and graphic that I insert it here.*

"What are those little hard knobs, about the size of a small pea, which are frequently seen upon the fingers, particularly a little below the top, near the joint? They have no connection with the gout, being found in persons who never had it; they continue for life; and being hardly ever attended with pain, or disposed to become sores, are rather

* Heberden, William. *Commentaries on the History and Cure of Diseases*, 1782, Chapter 28, pp. 119-120.

unsightly, than inconvenient, though they must be some little hindrance to the free use of the finger."

I have just this addition to make to the above description, namely, that under proper treatment these nodes do disappear and that while they are being stirred up they are quite painful. The changes in the larger joints are identical with those found in the smaller ones only on a larger scale and the knobs are more often spread out, diffused.

The tonic spasm of the skeletal muscles associated with these joint involvements results in very decided limitation in motion. This stiffness of limb and joint observed so frequently among persons who habitually do hard physical labor, is undoubtedly caused by this condition in the overwhelming majority of cases. In the milder cases this gives the patient a very characteristic walk, later puts a heavy burden on the will in willing to move the joints, and in the severest cases the condition becomes so pronounced that voluntary motion becomes impossible and passive motion, because of long continued non-use, very difficult and very painful and towards the end quite impossible.

F. GASTRO-INTESTINAL SYMPTOMS

In many of these cases the gastro-intestinal symptoms are the most distressing and are often the ones which bring the patient to the physician. In severe cases the lips are red, dry, parched,

cracked, and covered with herpes. The tongue is usually red and beefy at the borders, sometimes fissured, and even in the mildest cases the dorsum is always covered with a thin white fur which in severe cases may become a thick velvety coat, which has the peculiarity that it practically always retains its white color no matter how thick it may be. This as well as the rarity of pyorrhea I am inclined to ascribe to the hyperacid condition of the mouth and stomach which is so usual in this condition and in some cases so pronounced as to actually cause serration and eburnation of the teeth. In the early cases the gums are often swollen, spongy, and bleeding, while in the later stages they are often receding. Pyorrhea is surprisingly rare. The tongue and mucous membrane of the cheeks are often the seat of recurrent attacks of canker sores which do not respond to any form of local treatment, are often very painful and because of their interference with mastication may actually impair the nutrition of the patient. Mouth, tongue, and pharynx are often very dry, red, and congested, which condition causes a sensation of dryness and even burning of these parts as well as of the gullet, which in two of my cases was so distressing that it awakened the patients during the night, keeping them awake for hours. When they first awoke they were hardly able to move the tongue in the mouth and got only partial relief from the repeated sipping of water.

This excessive dryness often leads to the drinking of large quantities of water in an effort to get relief. In some cases hypersecretion takes the place of dryness and manifests itself in an increased flow of saliva, which in one of my cases resulted in long strings of mucus being pulled out of the mouth by the patient with her handkerchief for hours at a time. In only one other instance have I seen anything so annoying and similar to this and that was in the case of a pregnant woman with multiple fibroid tumors of the uterus. Sometimes the increase in secretion takes the form of a thick yellow phlegm which causes much hawking and spitting on arising in the morning.

The muscle spasm already referred to may involve the constrictors of the pharynx, resulting in spasm of the gullet, sometimes making swallowing very difficult, or it may involve the circular muscles of the lower end of the oesophagus and result in a true cardiospasm. In the stomach proper the disease may manifest itself by marked hyperacidity and again in antacidity with all the symptoms accompanying either of these conditions so that regurgitation of sour water, eructations of gas sometimes in enormous quantities and with much noise may occur; burning pain in the stomach and oesophagus, distension of the stomach with gas, nausea, and often very severe gagging and retching though rarely vomiting may be prominent symptoms.

There may also be a very pronounced pylorospasm and an actual hypertrophy of the pyloric sphincter as observed in two cases operated upon by myself where organic stricture had been wrongly diagnosed and only a pylorospasm with hypertrophy of the pyloric sphincter was discovered at the operation. As the result of this hyperacidity, dilation of the stomach, and spasm of the hypertrophic pyloric sphincter, the emptying time is sometimes markedly prolonged. Thus one of these cases showed undigested food in the stomach washings twelve hours after the ingestion of an ordinary meal.

In quite a number of these patients we find marked gaseous distension of the intestines with much flatulence and the repeated expulsion of foul smelling flatus, alternate looseness, and constipation of the bowels. In fact, in one of my cases, the repeated alternations of these two symptoms was so pronounced as to cause the examining internist to suspect organic stricture of the large intestines. When loose, the bowels are apt to be pasty, frothy, of foul odor, very acid and hence irritating to the rectum and anus. In the later stages of the disease we often find severe constipation, sometimes so severe as to cause a suspicion of organic obstruction, stools dry, hard, scyballous, requiring the daily ingestion of strong cathartics or the daily use of enemata. As a result of these digestive disturbances the patient often becomes seriously under-

nourished and if the condition is allowed to continue long the patient will in time suffer not only from Chronic Fatigue Intoxication but also from severe auto-intoxication with its various manifestations.

G. GENITO-URINARY SYMPTOMS

The genito-urinary symptoms are not very numerous but when present quite characteristic and sometimes very distressing. In nearly all cases, and particularly the severe ones, urine is very acid and sometimes causes considerable burning and tenesmus when it is being voided. As a general rule the urinations are increased in frequency, and nocturia even up to a dozen times a night is one of the most annoying symptoms. This nocturia is often present in spite of the fact that the urine with the exception of hyperacidity may be perfectly normal both chemically and microscopically, and does not usually disappear until the patient is well on the way to recovery. These patients show from day to day marked variations in the quantity of urine passed. Some days they will pass twice the normal amount in twenty-four hours and again they will pass a very small amount. In one very severe case there were three attacks of complete urinary suppression, twice lasting over twenty-four hours and once nearly forty-eight, each time followed by the secretion of enormous amounts of urine. Each time the patient was catheterized, on two occasions by

myself, without the slightest amount of urine being found in the bladder. During two of these attacks the patient was under close observation in the hospital so that I think deception can be reasonably excluded. The urine when passed was normal with the exception of being hyperacid. This patient has made a complete recovery without any form of surgical intervention and the symptoms referable to the urinary system have all disappeared. Very careful examination of this patient before, during, and after the attacks, disclosed no organic disturbance of the urinary organs, which I believe justifies the conclusion that the anuria and subsequent polyuria were entirely caused by the general systemic condition. Many of these patients lack the power of nocturnal concentration without any other evidence of renal disease.

The moderately advanced and far advanced cases all have indican present in the urine; sometimes in very considerable quantities, unless they have been on a meat and egg-free diet for a considerable period of time. Some of the very advanced cases show traces of albumen and a small number of hyaline and granular casts. Whether these last-named abnormalities are due to the disease itself or whether due to a distinct kidney complication, is difficult to determine.

In the earlier and moderately advanced stages, many of these patients, both male and female, are

quite erotic. In the advanced cases there often is partial and in the very late stages sometimes complete impotence.

H. RESPIRATORY SYMPTOMS

The respiratory tract is unusually sensitive to irritation, so that the inhalation of a minute quantity of irritating substance which would not be sufficient to produce an appreciable effect in the normal individual may produce extreme irritation in the respiratory mucous membrane of a person suffering from this affection, which in one case may produce extreme dryness of the nose and throat or in another case a profuseness of secretion such as is observed in Hay Fever or even in Bronchorrhea. Many of these patients are constantly complaining about a cold in the nose and head and on examination the Snyderian Membranes as well as the remaining lining of the nose and throat are found to be markedly swollen and congested, and local treatment does not give permanent relief until the general systemic disorder is cured. Some of these patients have frequent severe sneezing fits followed by profuse watery secretion during seasons of the year when Hay Fever is out of the question, and again they complain of a severe burning dryness of the nose and throat and even the larynx. Some of them are troubled with a constant short hacking cough and have great difficulty in getting up small

amounts of thick sticky mucos which continues to reform with a recurrence of the cough. As a result of this some are chronically hoarse without the laryngoscopic examination showing any pathological condition of the true vocal cords; again others in talking find their voices involuntarily jumping into high falsetto which they find difficult and even impossible to control. Some of these patients have severe attacks of asthma; thus, one of my patients who for three weeks at a time would be unable to go to bed, resting as best she could in a Morris chair, obtained no relief under the most skilled medical attendance until she was relieved of her general symptoms. Others suffer from a very peculiar and yet very characteristic form of breathing which can be studied best when the patient is in repose and not conscious of being observed; thus, such a patient while sitting quietly will be observed to have a very definite respiratory cycle, the first respirations being very shallow and moderately increased in rate, and after ten or twelve of these short, somewhat rapid, respirations the patient will pull himself together, apparently make a voluntary effort, take two or three very deep slow respirations, and in extreme cases often end up with a sighing respiration which reminds one somewhat of the sighing respiration which one usually observes after an acute hemorrhage of sufficient severity to cause a severe cerebral anemia. If these patients are

observed for some time these cycles of at first short and rapid finally deep and sighing respirations are found to repeat themselves at regular intervals. In only one other instance have I ever observed a similar peculiar respiratory cycle, namely in a condition called heaves, affecting horses.

I. CIRCULATORY SYMPTOMS

In the milder cases the circulatory system does not show any characteristic changes, while in the severe cases the variation from the normal is usually quite pronounced. In these latter cases the heart rate at rest is usually a little higher than that found in the average ambulatory patient. In addition, after a very short period of strenuous exercise the heart rate will increase more rapidly than it does normally and the rapidity of its increase will depend largely upon the severity of the condition. In the still more severe cases there is often a missing of the pulse beat of from every fifth to tenth beat. This peculiarity can be observed in these patients particularly after a few days of more than average strenuous work; will disappear with prolonged rest or after complete recovery. In several very severe cases I have in addition noted typical attacks of angina pectoris. In one such case in particular the attack of angina pectoris always came on after a day or two of strenuous exertions.

The blood pressure is sometimes slightly below, more usually normal, and again slightly increased, and occasionally very greatly increased. In cases of Chronic Fatigue Intoxication with marked increase in the blood pressure it is sometimes very difficult to determine definitely whether this increase is due entirely to the Chronic Fatigue Intoxication or whether this condition is complicated by an independent affection. As a rule the palpable arteries remain soft even in far advanced cases and no other definite signs or symptoms of arteriosclerosis can be discovered. Where other symptoms of arteriosclerosis besides high blood pressure are present a portion or all of the increase in blood pressure may be ascribed to this latter condition, as is also the case where there is positive evidence of advanced renal disease. However, I am rather inclined to believe that at least a portion of high blood pressure in the severer cases is caused by the Chronic Fatigue Intoxication itself.

The blood count averages about as does the blood count in the average patient consulting a physician in his office, with the following two exceptions: namely, that most of the more severe cases have a rather low leukocyte count and nearly all of the very severe cases have a relatively high eosinophile count and often a true eosinophilia. Thus one of my severest cases had a leukocyte count of 3600 per c. c. with fifteen percent of eosinophiles or 540

eosinophiles to the c. c. This patient had not only a low leukocyte count, but in addition a high percentage of eosinophiles with a relatively large number of eosinophiles per c. c. namely, a true eosinophilia. Another extremely severe case had 1328 eosinophiles to the c. c., while one year later when she had practically recovered no eosinophiles were found in 100 cells counted. In one of my severe cases the eosinophiles varied from five to twelve percent during a period of sixteen months. The lowest number of eosinophile cells found during this period was 410 per c. c. while the highest was 1176. After her recovery the eosinophiles dropped to one percent, or 60 per c. c.

Recently in carefully looking over all our differential counts for a period of five years, I was struck with the fact that with the exception of cases of definite blood disease, the only cases in the general run of patients that had over three percent of eosinophiles were cases of Chronic Fatigue Intoxication and these were all of the severer type.

J. NERVOUS SYMPTOMS

These patients are exceedingly sensitive to even the slightest variation from the normal because the range of normal reaction to stimuli of all kinds is greatly reduced. Thus a stimulus that would produce a normal reaction in the average person may

either have a greatly exaggerated effect or relatively slight effect and in extreme cases no effect at all, depending upon the severity of the disease. The first result likely to occur in the earlier stages, the second during the moderately advanced, and the third during the severe terminal stage. This peculiarity can be traced through all the symptoms but is more noticeable in the symptoms referable to the nervous system.

The nervous manifestations are very varied and are determined by the particular portion of the nervous system involved. If a motor nerve alone is involved a special group of symptoms develops; if a purely sensory nerve is involved another set of symptoms is present; while if a tropic filament alone is affected another group of symptoms occurs; if a mixed nerve is affected still another group of symptoms is found, and if in place of deposits on the nerve or in the sheath of the nerve the symptoms are caused principally by the toxins circulating in the blood, the vasomotor and mental symptoms predominate. If a motor nerve is affected by pressure from without by the deposits heretofore described or by deposits within the nerve sheath so that there is either extreme irritation on the one side or interference with the passage of nerve impulses on the other, the following motor disturbances are found to be present: fibrillary or tonic contraction of the muscles supplied by the

affected nerve, depending upon the severity and location of the nerve pressure. This tonic spasm sometimes results in very severe muscle cramps more often affecting the lower extremities though it may affect any of the muscles. In extreme cases nearly all of the muscles of the body, striated as well as unstriated and mixed muscles, may be involved. In cases where only individual motor nerves are involved we may have tonic spasm involving only certain muscles or we may have a clonic spasm as observed in tic convulsive and convulsive torticollis.

Physiologists tell us, what we all know if we reflect at all, namely, that healthy voluntary muscles are always slightly contracted, just enough to take out the slack. This is spoken of as normal muscle tonus. In this disease, however, this normal tonus is accentuated and the muscle passes beyond the power of relaxation either because of irritation of the spinal centers by the toxins circulating in the blood or possibly because of reflex irritation caused by the deposits in the tendon sheaths of the individual muscles. Or again both factors may be active. This tonic contraction if it involves many or all of the muscles and persists for long periods of time is necessarily very exhausting. And in the later stages some of these people actually do suffer severely from this condition. The exhaustion sometimes becomes so severe that every muscular effort

becomes not only almost impossible but excessively painful so that even the weight of the affected extremity becomes almost unbearable. One of my patients, one of our very best nurses, who had for years driven herself to the very extreme limit of her endurance, told me when she finally broke down that she wished she could unhook her arms so that she might get a little relief from the distressing exhaustion. John Muir, in his little book *Stickeen* says, "The man who said 'the harder the toil the sweeter the rest' never was profoundly tired." And further on in the text explains that both he and his dog, after their almost supernatural exertion, for days found it difficult to secure natural slumber because of their extreme exhaustion. Another highly trained person expressed himself in the following words: "Work which used to be a pleasure and which used to be performed with the greatest ease can now be accomplished only by the exertion of all my will power." Another patient who had for years gone to the limit of his endurance finally assured me that every muscular effort was so painful as to cause a feeling of nausea such as we have all experienced when some very sensitive portion of the body has received severe injury.

As the disease progresses, the margin of endurance becomes narrower and narrower until the slightest exertion causes complete exhaustion often accompanied with excruciating pain.

Both the muscle cramp and the severe exhaustion complained of by persons suffering from writer's cramp and musician's cramp are, I believe, symptoms of this condition. A pianist twenty-two years of age came to me three years ago with the following history: Four years before I saw her she began to do piano practice from six to eight hours every day. At the end of two years of this she began to have pain in her arms and shortly thereafter this became so severe and the arms became so weak that she could not continue either her practice or teaching. Later it became impossible for her to pick up a pin, to write, comb her hair, or even to open a door. When I first saw her she had been under treatment for two years with no relief. She showed very definite signs of Chronic Fatigue Intoxication and these with the progress of the case convinced me that she belonged to this class of cases.

Because of this severe muscular exhaustion finer co-ordination often becomes very difficult and such an individual in his walk and other voluntary motions, because of this inco-ordination and lack of muscle stability reminds one of the runner who is going on his second wind and swaying constantly in his forward motion. I am inclined to believe that the condition is actually very similar to that of the runner, for such individuals when once oversaturated with fatigue material are actually

all the time going on their second or even third wind, with the result that not only their muscle action is unsteady and wobbly but their mental processes are equally so. In the most extreme cases this muscle irritation and this lack of co-ordination merges into a condition which we call paralysis agitans, but which I am inclined to believe in the large majority of cases at least is purely a terminal stage of Chronic Fatigue Intoxication.

The patellar reflexes in most cases are apparently normal. In early acute cases they may be markedly exaggerated while in the late terminal cases they may be sluggish or entirely absent.

The vasomotor symptoms are quite characteristic. In the early acute cases there is a rapid alternate dilatation and constriction of the vessels even on very minute physical or emotional stimulation. In the later stages we get very characteristic symptoms of extreme vasomotor irritation or vasodilator paralysis when the complexion becomes an ashen gray or in other cases extreme vasomotor paralysis when the patient becomes chronically florid. Either of the latter two conditions associated with a marked thickening of the skin, when alcoholism and nicotine poisoning can be excluded, are usually conclusive evidence of the existence of this condition.

These patients are unable to adjust themselves to even slight differences in temperature. Thus a

temperature slightly colder or warmer than they are accustomed to often makes them very uncomfortable. If warmer, they complain of oppression and are apt to break out in perspiration, particularly in the axillae and groins and some of them complain much of sweating of the neck and head during sleep. A patient sometimes awakens night after night with hair and pillow wringing wet even though the body is not perspiring. If the room temperature is a little lower than normal, the patient is apt to be chilled and suffer much from cold feet and hands, which suffering in extreme cases may amount to actual pain.

The sensory disturbances are varied, sometimes moderate and sometimes extreme, consisting of numbness, tingling tenseness of the skin, burning and often severe itching, the burning being particularly annoying across the back, on the palms of the hands and the soles of the feet. There may be hyperalgesia and hyperesthesia present and most of the patients complain a great deal of tingling and numbness of the extremities and say the limbs are constantly going to sleep. If the sensory nerves are subject to pressure by the above described deposits the sensory disturbances are very marked, in fact, neuritis is one of the most frequent and distressing symptoms of this affection. The neuritis may be general, multiple, or single. All of the sensory nerves may be affected. One of my

patients suffering from this condition said half jokingly and half seriously, "I even have rheumatism of my hair," and the fact was that brushing his pompadour ever so lightly caused severe pain. Some of the large nerves can actually often be followed by the examining finger both because they are palpably swollen and extremely sensitive. Many of the patients suffer severely from sciatica, lumbago, tri-facial neuralgia, and neuralgia of the brachial plexus and may suffer from neuralgia of one or all of the sensory nerves.

Difficulty of adjustment to new conditions and surroundings is a common symptom and while they are always dissatisfied and trying to get away from their present occupation they never do well in their new vocation. The city man suffering from this condition tries the country and practically always fails; the farmer sells his farm, goes into business in the city, and makes a failure of it. Among the well-to-do class many of them run from physician to physician, from sanitarium, to sanitarium, some becoming almost wanderers on the face of the earth, travelling hither and thither from country to country trying to get away from their misery. It has seemed to me sometimes that they are trying to get away from themselves which they cannot do of course until death relieves them. And let us learn to realize that these ailments are sometimes

as painful as is an ulcerated tooth or a boil and much more distressing because of their persistency.

The organs of special sense are often affected. With taste the two most common complaints are, being annoyed either by a metallic taste or a sweetish taste. The sense of smell is sometimes somewhat impaired by the chronic congestion of the Snyderian membrane or the excessive dryness of the nose.

The hearing is sometimes markedly affected. Some find the slightest noise distressing, after a short time all music trying, even the best, and discords in music actually painful. A highly educated patient of mine, in fact a professor of music in one of our secondary colleges, suffering from this condition described her sensation in the following language: "Noises, monotonous, continued noises make me really suffer. Noises, such as the rattle of wheels of the elevated trains, cars, whistles, or clanking of automobiles, human voices, the squish, squish of the gum chewing fiend, etc." In the early stages the hearing may be hyper-sensitive so that a patient notices and is annoyed by sounds which would not even be heard by the normal person. Later the hearing often suffers severely and I am rather inclined to believe that some at least of the progressive deafness which we see so commonly as age advances is due to this condition. This progressive deafness in these cases is the result of two

conditions: namely, the chronic congestion of the pharyngeal mucous membrane which congestion I believe extends up into the eustachian tubes, plus the chronic spasm of the tensor tympani muscles. These two factors acting together cause a retraction and a chronic tenseness of the tympanum which at first makes the hearing more acute and sound waves unduly irritating to the terminal nerve endings of the inner ear and later seriously interferes with the transmission of sound.

In the eyes the following symptoms have been noticed: the palpebral borders are often markedly irritated and reddened and some of these patients chronically appear as though they had not had enough sleep—much like the man who has been out the night before. The eyelids and the conjunctiva are sometimes markedly congested and swollen, the former occasionally slightly fissured about the canthi, which often causes irritation and itching. I have on several occasions, in getting the history of such a patient, observed him again and again unconsciously rubbing his eyes and have been reminded of a little boy staying up too late in the evening and the sandman appearing. Sometimes in extreme cases there exists a pre-senile arcus-senilis and irregular pigmentation of the iris. The sclera quite often is sub-icteric. In the early cases the pupils are apt to be very large and react to light more quickly than normal. In the later

cases they are often very small, almost rigid, and react very slowly to light and accommodation though I have never observed any irregularity of the pupil. These patients often suffer much annoyance from spasm of the ciliary muscles, and oculists find it very difficult to fit them with glasses because a lens which may seem to correct the difficulty today will be found utterly unsuitable in a day or two, and even while the eyes are being tested the patient will often give entirely contradictory answers as to which lens is the most acceptable. I have sent quite a number of these patients to different prominent oculists in the city who have experienced this same trouble and not until they are relieved of their systemic disorder was it possible to properly fit them with glasses. In the milder cases the field of vision does not seem to be altered but in the later stages of the severe cases there is considerable contraction of the field of vision.

In the early stages the retina seems to be excessively sensitive and objects become noticeable that would not ordinarily be noticed by the normal person, thus, several of these patients have complained to me that in riding in a street car, for instance, they see everything and involuntarily read every signboard that flashes across their field of vision and that the only way in which they can keep themselves from doing this is to close their eyes. This peculiar symptom also disappears after

the patient recovers. In the more advanced cases this hyper-sensitiveness may be replaced by scotoma scintillans, amblyopia, and asthenopia.

Extreme irritability is one of the most constant symptoms in the severe cases and one of the earliest manifestations of the disease and appears in many forms. Thus, these people are, without exception, excessively sensitive to all emotional influences and an innocent unoffending remark by a friend may be misconstrued and taken up as a slight and result in a flood of tears, or the same remark be construed as an insult and result in an outburst of rage. This irritability is equally manifest when the stimuli affect the ordinary senses or the special senses. Thus, rubbing the finger tips over a slightly roughened area instead of simply being disagreeable may be expressed as causing excruciating pain. One of my patients was so sensitive that he could scarcely stand having his shoes polished while on his feet. This irritability manifests itself on the slightest variation from the usual or normal and all extremes become distressing to the patient.

In the earlier stages, the irritative labile stage, the patient is constantly trying to go faster and faster. One of my patients expressed it in the following manner: "When riding in a street car, in an automobile or even a train, no matter how fast it goes I feel like getting out and pushing."

When speaking such a patient finds his mental processes constantly running away from his ability to express himself in words and he is annoyed by the fact that he cannot speak as fast as he is thinking. When writing, he becomes more and more irritated by his inability to keep up with his thought processes, and his writing becomes more and more illegible, partly because of exhaustion of his forearm muscles and partly because of the ever increasing speed in his effort to keep up with his thought processes.

This tendency to speed up manifests itself in other ways. During the early stages of the disease these persons are able to and often do turn out a prodigious amount of work, but when the speed exceeds a certain limit and the exhaustion reaches a certain point the quality of the work begins to deteriorate, gradually gets poorer and poorer until it no longer can pass inspection, and when this point is reached the quantity of output rapidly decreases until eventually all work is impossible.

This restlessness further manifests itself by the constant urge to always be doing something such as whistling, chewing gum or tobacco with almost incessant spitting, continuously puttering with a pipe, lighting and re-lighting the same, twirling of fingers, restless moving in the chair, jiggling it or the one immediately in front, constant talking, or if the patient is wealthy he has some one constantly

reading to him or entertaining him in some other way. These patients find it impossible to secure rest or relaxation and the internal unrest is sometimes apparently as severe as that seen in severe cases of hyperthyroidism. In other words, their nerves are always on edge. They are never serene or composed. Quite a number of these people have complained to me that they find it impossible to keep themselves from going over and over the same thoughts or the same disagreeable experience and one expressed it as "constantly thinking around in a circle." In extreme cases their minds actually become stereotypic.

In the later terminal cases the extreme irritability with its various manifestations as above detailed may be replaced by listlessness and extreme lethargy.

Nearly all of these patients suffer to a certain extent from restlessness in their sleep, dreaming much and particularly going through difficult tasks such as climbing mountains, carrying heavy burdens, etc., and waking up in the morning utterly exhausted. With quite a number insomnia becomes a serious matter. Thus, I had one young woman whom I kept under most careful observation in the hospital, who was found to actually sleep only one hour out of every forty-eight for a period of weeks. As her condition improved her insomnia gradually improved and when she left the hospital after

several months of treatment she slept continuously and soundly, without any hypnotic whatsoever, from seven to nine hours every night. Many of them find great difficulty in going to sleep at all. Some lie awake until three or four in the morning, while others go to sleep fairly promptly but awaken at one or two when they lie awake until getting up time. Many of them become excessively sleepy at inopportune times during the day and are then sometimes the subjects of long continued fits of yawning. The sleeplessness seems to be due to one or two causes or both combined; namely, to some toxin circulating in the blood and irritating the brain cells and to the fact that so many of these patients suffer from chronic neuritis and are unable to find a comfortable position in which to lie long enough to fall asleep. As a consequence of the insomnia and restless sleep and because they are unable to completely rid themselves of all of the fatigue material each night, they rarely arise in the morning refreshed and eager to work. In fact, most of them will say that they feel particularly exhausted and out of sorts when they get up and that as the day wears along they gradually begin to limber up and feel best about bed time. The fact is that in the course of the day they gradually get their second or third wind and consequently feel better towards evening. In the severer cases this is really a very characteristic symptom and one

which many of the patients mention of their own accord. It was only the other day one of these patients asked me the question: "How is it that I feel so miserable on arising, gradually better as the day wears on, and fairly comfortable toward evening?"

Headache is a common symptom. It may be frontal, temporal or occipital, or more often just a feeling of fullness and constriction of the head. These headaches are not only very distressing but they greatly impair the accuracy and clearness of thinking as well as the alertness and efficiency of the individual thus afflicted.

In the earlier stages of the disease, because of the constant distraction due to the hyper-sensitiveness of the sensory organs, and in the later stages, because the mental processes are befuddled, beclouded and undependable, these patients often lack the power of concentration. Intellectually, too, they seem to reach their limit of growth and development long before their time becoming the victims of pre-senile degeneration and decay. When they get into this condition they no longer seem to be able to acquire new knowledge or to branch out into new fields; or in other words, they lose their plasticity and become "set" long before their time.

Their imagination becomes so impaired that they are unable to differentiate between their "day dreams," their "castles in Spain," and reasonable

realizable hopes and ambitions. This makes them formulate not only for themselves but for others, all manner of bizarre plans and schemes which are either entirely impossible of execution or turn out to be so impracticable and unprofitable that they are abandoned before completion, only to be succeeded by other equally unprofitable undertakings. Thus these persons sometimes fritter away not only what little energy they have left but also money previously accumulated by their over strenuous activities.

These patients are unable to quickly recover themselves if they make a false step, be this false step a physical or a mental one. In other words they lack physical nimbleness and mental alertness. Such a person, if he makes a physical misstep is likely "to fall all over himself," as the boys say, before he can recover his equilibrium, and if he makes a blunder in his speech he is likely to get in deeper and deeper in his effort to extricate himself with the result that his apologies and explanations add only to his embarrassment.

In the early acute stages the moral sense is often very acute and these individuals will criticize their fellowmen severely for infractions of ethics which are so trivial that the average man would scarcely pay any attention to them; while in the latest stages the moral sense may become very much blunted and the patient is apt to get into the

"what's the use," "laissez faire," "nitchivo" stage and overlook moral lapses that would shock the normal individual.

The general nutrition of the body in this condition shows some very definite changes. In the very acute stage when the patient is high-strung and nervous and going at top speed, his subcutaneous adipose tissue is markedly reduced and he is likely to have the appearance of being wiry and sinuous. Towards the end of the affection these people are likely to quite suddenly put on a very considerable amount of fat and to look heavy, pudgy, and even obese, but at the very end there is apt to be a sudden and marked falling off of the fat, and the patient often looks as though he had gone through a severe illness. The clothes which fitted snugly three or four months previously, hang loosely. When this stage has arrived, acidosis and dissolution are usually not very distant.

In a number of instances I have noticed that patients suffering from this affection lack resistance to infections of all kinds. Thus one of my patients went into a deep coma a few hours after suffering a slight infection of the finger, which if he had had normal resistance could scarcely have produced such disastrous results because the infective organism in question was not of a very virulent variety. The lack of resistance to infection is furthermore emphasized by the fact that many

of them are constantly subject to severe colds. Whether this is entirely due to their lack of resistance to infection or whether partly to their vasomotor imbalance, is, of course, undeterminable, but I am rather inclined to believe that both of these factors play their part.

Practically all of these patients show defective emotional reaction and control, probably best expressed by the word extreme. Thus they are apt to be either over-cautious or reckless, timid or fool-hardy, shy or over-confident, extremely reserved or obnoxiously bold, mushy or stubborn, over-credulous or over-suspicious, intemperate or ascetic, stingy or extravagant, haughty or servile, taciturn or garrulous, and only too often such an individual behaves like an over-tired, peevish child. They are apt to be excessively vain and hence subject to flattery, often stubbornly adamant to the good advice of their best friends and liable to do anything and everything to their own detriment in the hands of designing flatterers. Many of them suffer from abnormal humility and self-depreciation and again others from an exaggerated ego, over-estimating their own importance to society, the quality of their work, and the value of their possessions; constantly bragging about themselves and always dealing in superlatives and gross exaggerations. When this state of mind, which I have sometimes felt like calling *caput magnum malignum*, is associated

with another symptom which I have sometimes called limelightitis, and acquired late in life, it is almost always a part of the condition under consideration and if other symptoms of this disease are found, is rather conclusive evidence that the disease is far advanced. In addition, some of them are prone to want to give their unsought advice to everyone, thus making themselves a nuisance, to lord it over everybody, and to interfere with other people's personal affairs. Some of them have a tendency to pre-senile garrulity, frequently telling the same story to the same individual. Thus I recall a prominent middle-aged man suffering from this condition who, during a railway trip of four hours, repeated the same incident, told the same story, and used the same illustrations, to the same group of fellow travelers three times.

The impairment of judgment above referred to manifests itself in many ways and will sometimes explain how a business man, with a splendid reputation for unusual business judgment, will gradually lose his grip on things. The same is not an uncommon experience among overworked professional and public men, and explains how it happens that some of the leaders of their professions as well as political and educational leaders sometimes bring out and give expression to utterly stupid theories in public statements.

In business as well as in their private lives, these persons are likely to become excessively optimistic or senselessly pessimistic, believe in the first place in all kinds of wild, unwise schemes, investing and losing their money in them, or completely losing confidence in themselves and afraid to venture anything. This latter may gradually develop into a senseless fear or extreme melancholia, sometimes in desperation, actually leading to suicide.

In their home lives, too, some of them show pronounced changes. Thus a person who has been fair and sensible in his home expenditures may gradually become more and more penurious, refusing to buy little comforts and conveniences, or to pay his honest workmen a reasonable wage, but spend with a flourish and a lavish hand large sums of money on some entirely useless but more or less showy project.

Sometimes there is a marked change in temperament and disposition and in extreme cases there is almost always a distinct loss of poise and an utter inability to find repose. Sometimes disagreeable temperamental characteristics are markedly accentuated and again there is a very noticeable change in disposition, usually for the worse. An even tempered person is apt to develop a temper, constantly upset about trifles, flying into a rage about next to nothing, subject to emotional storms, constantly beset by doubts and fears, likely to become a faddist with fixed ideas, very enthusiastic and visionary one

minute and utterly down in the dumps the next. Some of these persons in important executive positions become gradually more and more servile to their superiors; taciturn, selfish, ungenerous with their equals; jealous and unfair with their competitors; and, with their subordinates, they are likely to be overbearing, bullying, dogmatic, arbitrary, and dictatorial, prone to ridicule and sarcasm, and their laughter on such occasions is apt to degenerate into an ironic chuckle. They lose their ability to sit down to quiet discussion of the problems confronting them; instead, an exchange of opinions usually degenerates into a debate or an argument, and the most trivial and unimportant subjects are apt to be treated with a seriousness and a vehemence as though great prizes were at stake. They are subject to senseless and violent personal likes and dislikes. Their loyalty often degenerates into clannishness. Many of them become excessively suspicious of their best friends, inordinately jealous of their competitors, afraid of impending danger and disaster—in fact, they worry about everything. In this connection it must not be forgotten that every individual inherits from his ancestors and thus brings into the world a set of more or less fixed tendencies and certain well-defined characteristics, and under normal conditions of the nervous system reacts to certain stimuli in a definite way which for him may be considered normal. Thus an individual inherits a cer-

tain concern coefficient for his interests which for him is normal and which, if either hypo or hyper sensitive as compared with the average human being, can ordinarily be considered improved by a deliberate effort of the will and long-continued self education. In severer cases of this type, however, such self-control becomes less and less effective as the condition grows worse and the normal concern develops into worry. This worry decreases spontaneously as the patient gets better and disappears completely when he has entirely recovered. This illustration about worry and the normal concern coefficient is typical of all of the crucial traits and the same peculiarity would be observed in all of them; therefore, in taking the history of a patient it is not only essential to observe and note what we actually find, but to ascertain as nearly as is possible what is normal for the patient being examined. Some persons inherit and hence are born with a chronic grouch. With such an individual the discovery of a chronic grouch should not be counted an additional symptom. However, if a perfectly normal or cheerful individual gradually develops grouchiness, it behooves us to look for the cause, and on careful examination of the case we are very apt to find some of the ear marks of this condition. On the other hand, some individuals are just naturally born extreme optimists and always talk in big figures. If such an individual

tells you that the newest venture in which he has just embarked is going to make him and all his friends a lot of money, one has a right to ascribe his talk to his extreme optimism or possibly to his salesmanship, but if he has been a normal individual all his life, has nothing in particular to sell, and then some day begins to talk in millions, it is well to look for the other symptoms of paresis, while if he simply talks in thousands it is well to look for other symptoms of Chronic Fatigue Intoxication.

K. EXACERBATION

In the severer cases acute exacerbations occur quite frequently. For a long time I mistook these recrudescences as mild or moderately severe colds, because they simulate what we speak of as a cold very closely, but lately I have been able to demonstrate to my complete satisfaction that they are not colds, are in no way related to colds, but are actually acute exacerbations. They can be produced almost at will by excessive work or by a hard massage of one of the deposits so frequently described. Only the other day I had a masseur rub out a deposit in the tendon of insertion of the left gluteus maximus muscle of a chronic patient who at this time had almost recovered from this condition and considered himself practically well. The very next day the patient was suffering from

malaise, burning, and rawness of the mouth and throat, bleeding from the gums on brushing his teeth, slight rasping cough, irritation and redness of the conjunctivae, chilliness along the spine and later feverishness, though the mouth thermometer registered no rise in temperature, considerable flatulence, burning urination, severe headache, and general lassitude, followed on the third day by Herpes Labiales. The condition began to improve on the fourth day and the patient was quite himself again by the seventh day.

L. AGE

The period in life when this affection develops is somewhat difficult to determine because most patients do not come to the physician for relief until they have suffered for a considerable length of time, sometimes for years. While I am inclined to think, as before stated, that the very beginning of the affection is frequently laid during or shortly after puberty, the youngest case that has actually come to my attention was eighteen years of age. This young woman, strange to say, showed well-developed and advanced symptoms of the disease and it took me nearly two years to secure complete recovery. This is the only case that I have ever seen in the second decade of life. In the third decade the cases are more numerous, in the fourth decade they are still more numerous, and the great-

est number of cases are found in the fifth and sixth decades.

M. CONCLUDING OBSERVATIONS ON SYMPTOMATOLOGY

This rough outline of the symptomatology, though incomplete, will I believe, give a true general picture of the condition. However, there are still a considerable number of points which will have to be worked out more in detail. Among these may be mentioned some of the skin and tendon reflexes, surface temperature, rectal temperature, and blood chemistry. An attempt to work out the last mentioned, will, I think, have to be deferred until more definite data on the normal blood chemistry are at hand. My knowledge of the observed symptoms inclines me to the belief, however, that great variation will be found in these undetermined symptoms, depending upon the stage of the disease of the patient under examination.

Anticipating the possibility that the great variety and multiplicity of symptoms above enumerated and the fact that the same symptoms are also present in a great number and variety of other diseases might confuse the reader or even make him doubt the possibility of any one disease having so many and varied manifestations, impels me to again call attention to the well-known fact that lues can, and occasionally actually does, symptomatically simulate practically every other known

disease. From the foregoing recitation of symptoms it must be evident that this disease is, if anything, even more protean in its manifestations than is syphilis and that practically every normal physiological function may be altered. This is really not to be wondered at when we consider that many of the symptoms are unquestionably caused by a toxin or toxins circulating in the blood which may affect the function of every organ in the body, as the circulating blood must of necessity be distributed to every organ in the body to bring new nutrition and remove waste, and in fulfilling this function it also brings the toxin or toxins with it.

The fact must be again emphasized that no one patient will at any one time or even in the whole course of the disease display all of the symptoms enumerated, no matter how severe the affection may be. However, every one of the symptoms above mentioned has actually been observed in patients suffering from this condition and its relation to the general affection has been established in each case with a reasonable degree of certainty.

CHAPTER IV

DIAGNOSIS

Chronic Fatigue Intoxication is about as pleomorphic a disease as is syphilis and like syphilis may simulate almost every other disease known to medical science. If it is true, as I believe it is, as Prof. Hyde repeatedly said in his clinics that "no man can be a truly great internist or for that matter, specialist of any kind, without a thorough and comprehensive knowledge of syphilis in all its manifestations," I believe the same statement is equally true of the disease here under consideration. However, in uncomplicated moderately and well-advanced cases the diagnosis offers little difficulty if one keeps in mind the very characteristic signs and symptoms and will look for them in every case where the diagnosis of this condition is at all in question. The most characteristic and never failing signs and symptoms in the moderately advanced and well advanced cases are tonic muscle spasm; tender, painful, circumscribed deposits in the tendons of origin of the larger skeletal muscles, in the subcutaneous areolar tissues, and in the intermuscular septa; and the very peculiar and characteristic patches of thickened skin. While we have chronic muscle spasm in various other affections,

as in the later stages of hemiplegia following cerebral thrombosis and hemorrhage, the hemiplegias of childhood and in Little's disease, tetanus, and possibly a few others, because of their general dissimilarity these offer no serious difficulty in diagnosis. In the very early and the late terminal cases more difficulty is encountered, and the greatest difficulty will be met with if this condition is complicated by some other affection or if it complicates some other disease. Thus, while ordinarily it need not be particularly difficult to make a differential diagnosis between this condition and gall stones, though I have seen these two conditions repeatedly confused in diagnosis, gall stones may actually complicate this condition, and then the making of correct double diagnosis presents considerable difficulty. I have actually had several of these cases where complete restoration of health did not occur until the one was relieved by operation and the other by suitable after treatment. Quite a number of the Chronic Fatigue Intoxication patients have a very tender, painful deposit at the tendinous insertion of the rectus abdominis on the tip of the right seventh costal cartilage, which has misled many an abdominal surgeon into the belief that such a patient is actually suffering from gall stones; however on careful examination it can be ascertained that this point of tenderness is caused by a little split pea-sized deposit which

can actually be felt to move under the examining finger, and which is exquisitely tender and can be removed by a few properly given massage treatments, when the pseudo gall stone symptoms will promptly disappear. An additional point in helping to make the diagnosis is the fact that in almost every such case a corresponding similar deposit is located over the tip of the seventh costal cartilage of the left side and often other similar deposits at the other points of insertion of the rectus abdominis on the lips of the fifth and sixth cartilages on both sides and also on the ensiform. One point, however, which is confusing and may easily mislead, is the fact that in this condition, as well as in gall stones or gall bladder trouble, the right rectus is usually tense. However, if gall bladder disease does not co-exist and if one will be careful in making the examination not to traumatize the little tender deposit on the tip of the fifth, sixth, and seventh cartilages, one can usually make pressure under the costal arch, get the muscle to relax fairly well, and then discover that there is no tenderness over the gall bladder itself. If on the other hand, gall bladder disease co-exists with this condition, the gall bladder also is likely to be tender and the rectus muscle will not relax at all. The differential diagnosis between gall bladder disease and this condition is sometimes further complicated by the fact that quite a large per cent of the more

severe cases of Chronic Fatigue Intoxication actually present a distinct sub-icteric condition of the sclera and the skin is often muddy, closely simulating true jaundice. Quite a number of cases have come to my attention where an abdominal section had previously been made with the expectation of finding gall stones or other gall bladder disease, where no stones were found and where drainage or even cholecystectomy gave no relief either from the pain, digestive disturbances, or discoloration of the sclera and skin; where I was able to demonstrate a sufficient number of the unmistakable signs to make a positive diagnosis of this condition and where I was actually able by suitable treatment to secure a complete cure without further operative intervention.

Probably the most frequent difficulty in making a differential diagnosis is encountered in differentiating the various neuralgias so frequently a part of this disease from various other conditions. Every clinician of large and varied experience is fully aware of the fact that wherever pain exists we must always consider the possibility of neuralgia. Here we have the advantage of having other signs and symptoms to help us out in our diagnosis, signs and symptoms which I am inclined to believe have heretofore usually been neglected in making these differential diagnoses. We all know that ordinarily it is very difficult to exclude the possibility of

neuritis wherever pain exists and we must sometimes make a differential diagnosis between this condition and any of the diseases which may be mistaken for neuritis. Thus for instance, not long ago I saw a case suffering from this condition and a part of the general symptoms was a severe neuritis of the right small occipital nerve, which resulted in the faulty diagnosis of a right acute mastoiditis. On careful examination I was able to convince myself that the tenderness over the mastoid bone was simply a part of the general condition of Chronic Fatigue Intoxication. Subsequent progress of the case proved the correctness of this conclusion. A short time later I saw a case that had been diagnosed as acute tonsilitis where, as a matter of fact, the patient was simply suffering from a neuritis of the sensory nerve of the tonsil. It apparently had never occurred to the specialist who had advised a tonsilectomy that one-sided tonsilitis is an exceedingly rare condition. I have also seen quite a number of cases of trifacial neuralgia which were thought to be caused by defective teeth, in which neuralgia was simply a part of the general condition. In a number of these cases perfectly healthy teeth had been sacrificed without a particle of relief. One very severe case of supposed infection of the left antrum was also found to be simply a trifacial neuralgia due to this condition.

An intercostal neuralgia due to this condition is sometimes mistaken for a dry pleurisy. A deposit on the sensory nerve supplying the skin over McBurney's point has repeatedly been mistaken for appendicitis. I have seen a number of cases that had been operated upon for appendicitis where the pain was not relieved, where this deposit could actually be demonstrated and where the patient recovered completely under suitable treatment without further operation. A deposit over the sacro-iliac joint is frequently mistaken for sacro-iliac disease. This mistake need, however, not occur if one will look for the other symptoms of this disease on the one hand and carefully look for the other symptoms of sacro-iliac disease on the other hand.

In the first instance the deposit can always be found and in the second instance lateral pressure upon the ilium always elicits characteristic pain symptoms. The correct diagnosis in a severe case of pruritus is sometimes rather difficult. However, if the case comes to the physician before it is obscured by scratch marks, the difficulty is not so great, for in pruritus caused by this condition numerous other characteristic symptoms and signs can always be found. If jaundice due to gall bladder disease, or cachexia due to malignant disease, can be excluded, as it usually can without difficulty in these cases, it is well to look for other symptoms of Chronic Fatigue

Intoxication in all cases of pruritus where a local cause cannot be found.

A differential diagnosis between spastic flatfoot and this condition is sometimes difficult, particularly as spastic flatfoot is a frequent complication. However, if careful search is made and other symptoms of this condition cannot be found, the diagnosis of spastic flatfoot uncomplicated by Chronic Fatigue Intoxication can usually safely be made.

The differentiation between the joint manifestations of this disease and independent joint diseases such as joint tuberculosis, seems to offer the greatest difficulties and is probably the most common source of error in diagnosis. Thus, I have seen a number of cases of Chronic Fatigue Intoxication that have been wrongly diagnosed as spinal caries and tuberculosis of the joints of the lower extremities. While joint tuberculosis is practically always accompanied with muscle spasm and atrophy of certain groups of muscles, the muscle spasm and muscle atrophy involve only those muscles which have to do with the movements of the involved joint. Such localized muscle spasm and muscle atrophy is practically unknown in Chronic Fatigue Intoxication. In addition, the joint involvements in this condition are much more insidious in their onset, confined to periarticular structures, less diffuse, and the joint is less painful on passive motion.

We still frequently hear the term "chronic muscular rheumatism." I am very doubtful whether there is such an independent disease and am inclined to believe that what is thus named is instead always merely a symptom of Chronic Fatigue Intoxication.

This disease is, I believe, sometimes wrongly diagnosed as "chronic spinal muscular atrophy," or, as some neurologist called it, "progressive muscular atrophy." True progressive muscular atrophy is now considered to be a disease of the gray substance of the cord in which there is an actual wasting of the ganglion cells. In the early stages of the disease under consideration there can scarcely be any destruction of the ganglion cells, otherwise the recovery and regeneration of the muscles could hardly be as perfect as it actually is. Whether this disease may sometimes result in chronic spinal muscular atrophy and the latter in such cases be simply the terminal stage of Chronic Fatigue Intoxication, is a question the answer to which I believe will have to be deferred for the present.

In all cases where a differential diagnosis between this condition and other affections must be made, it is of course very important to look for and find a sufficient number of the important unmistakable signs and symptoms enumerated under symptomatology before a definite, positive diagnosis is made.

A differential diagnosis between this condition and the so-called functional neuroses should not be difficult if one will carefully look for the various signs and symptoms enumerated under symptomatology. The only difficulty that can arise is in cases where the one condition complicates the other, though my experience is that these two conditions very rarely occur in the same individual, because the patient who is likely to suffer from functional neuroses rarely has enough will power or purpose to push himself to the point where he is in any danger of acquiring Chronic Fatigue Intoxication.

When all known diagnostic methods fail we are sometimes, though rarely, compelled to resort to the clinical method or what is more often spoken of as a therapeutic diagnosis. Every physician with large clinical experience has repeatedly been compelled to resort to this method when other diagnostic methods have failed. Here, as in lues, the therapeutic test is often valuable in clearing up a doubtful case. Even today with all of our refined diagnostic aids in diagnosing syphilis this diagnostic test sometimes is the only one that gives us the correct diagnosis, as can be illustrated by many clinical cases and is concretely illustrated by the following case taken from my case records. A widow, forty-six years of age, came to me five years ago suffering from repeated moderate hematuria and albuminuria accompanied with pain in right

kidney region, and severe headaches. Repeated careful examinations of the catheterized specimen failed to reveal tubercle bacilli. The segregated specimen showed that all of the blood and albumen came from the right kidney. Wasserman negative. History failed to give any clue to her trouble with the exception that the first two pregnancies ended in miscarriage. This patient had been under the care of one of the most prominent oculists of this country for a number of years, who was corresponded with and who never suspected lues. She was placed on intensive anti-luetic treatment for about two years and has been perfectly well, at least so far as her symptoms are concerned, for about three years, the urine has become perfectly normal, and the headaches have entirely disappeared.

The value of the therapeutic test is further illustrated by the following case: On April 20, 1921, a farmer forty-six years of age, came to me with the history that one year previously he began to have pain in the neck and left shoulder; noticed a small lump in left cervical region which disappeared during the warm weather, felt quite well until last fall when lump was noticed again. On December 18, 1920, had lump excised but wound had been draining ever since. On April 21st a sinus of neck was carefully dissected out and finger-like projections and pockets were found extending in

various directions. Careful microscopic examinations of the fresh specimen and of the hardened specimen were made and examined particularly for tuberculosis and actinomycosis, but neither could be found. Wound healed nicely but after four weeks sinus reappeared. Discharge was again examined repeatedly for fungi, but none could be found. About two months after the second operation the patient was put on one dram of potassium iodide after each meal for three days of each week. Within a month the sinus was completely healed and has remained healed ever since.

In cases where the diagnosis has been somewhat in doubt I have repeatedly placed the patient on suitable treatment and in a relatively short time have been able to make a correct diagnosis. Thus, for instance, cases suffering from this condition in which asthma is a prominent symptom will often temporarily get worse when treatment is first instituted, and then make a complete and permanent recovery. Some five years ago a middle aged woman came to me suffering from a severe attack of asthma which for several years had resisted the most skilled treatment of a number of competent internists. She had not been in bed for three weeks, was suffering constantly from dyspnoea. My diagnosis was that she was suffering from Chronic Fatigue Intoxication with spasmodic asthma as the prominent symptom. She was placed on suitable

treatment; in a very few weeks she was much improved, and in a few weeks more made a complete recovery and has been perfectly well since. Many other case histories could be given illustrating the value of the therapeutic test in making a differential diagnosis, but I believe the above will suffice here. It might be well to simply add that if these case histories were given they would emphasize the fact that the signs and symptoms above mentioned would all be found to be amenable to proper treatment if actually a part of the disease under consideration, providing of course that the disease is not too far advanced.

If it had not been for the therapeutic method, the relation between the peculiar case of sudamina described under symptomatology and this condition could not have been demonstrated.

The differential diagnosis between Chronic Fatigue Intoxication and lues sometimes offers considerable difficulty, particularly in the latter stages of both diseases, especially if the Wasserman and spinal punctures leave us in the lurch and if it is impossible to secure a reliable history. This is one of the differential diagnoses where the therapeutic test sometimes is necessary and where it alone is able to clear up the situation.

That the deposits above described have a definite relation to each other and to the disease under consideration, is evidenced by the fact that if one of

these deposits is subjected to vigorous massage or other forms of traumatism, all of the others will light up and become sensitive. In fact, this is one of the best ways to find the deposits in the different portions of the body and one of the best aids to a differential diagnosis. Of course, if the disease is very far advanced and the deposits are very numerous, the patient will simply feel sore all over, but if the disease is less far advanced or approaching recovery, a thorough massage over one of the deposits will cause pain in the remaining deposits. Thus some time ago I had one of my masseuses devote most of her hour to a palpable sensitive deposit at the insertion of the muscles in the posterior lip of the left great trochanter. Within a very few hours the patient complained of pain in the same location on the opposite trochanter, a pain to the inner surface of the tip of the scapula, pain in the temporal regions, pain at the origin of all the flexor muscles of both forearms, and a lighting up of the Heberden's nodes. The nodes became acutely inflamed, red, and very painful and tender. In a couple of days the nodes became quiescent only to light up again each time one of the deposits was stirred up, until finally they disappeared entirely when all of the deposits were removed by massage.

Not only this but practically all of the symptoms will be temporarily aggravated, after stirring up

one of these pathological accretions; thus patients suffering from nocturia, frequent micturition, or polyuria will often have all of these symptoms markedly aggravated. One of my patients who ordinarily has to get up to urinate once each night passing approximately 250 cc. of urine, had to get up three times the night after particularly vigorous massage of one of these spots and passed about 1,000 cc. of urine in eight hours and this without an unusual intake of fluids. Nervous symptoms such as irritability, unrest, insomnia, garrulity, depression, etc., are often markedly increased. Muscle spasm may also be worse after one of these treatments, and patients suffering from spasm of the internal and external muscles of the eye often find their symptoms greatly aggravated and complain of much blurring, partly because of the muscle instability and partly because of retinal exhaustion. All of this emphasized the desirability of employing the therapeutic test in doubtful cases.

Each one of the specialties will, I believe, find in this disease an explanation of some of its heretofore poorly understood and unsolved problems. The refractionist will find that some of his most difficult cases of spasm of the ciliary muscles will be found to suffer from this disease and he will find that when the disease is cured refraction becomes a relatively easy matter. The general oculist may find some help in the treatment of scotoma

scintillans, amblyopia, and asthenopia and possibly an explanation of his heretofore unexplained non-traumatic separations of the retina. The rhinologist will, I believe, find some aid in the treatment of some of his patients suffering from chronic catarrh of the nose and throat and alterations in the voice such as high falsetto and hoarseness. The otologist may find some suggestions helpful to the better understanding and treatment of progressive deafness; and the stomatologist, I hope, be aided somewhat in his understanding of gingivitis, bleeding and receding gums, canker sores and herpes labialis. The gastro-enterologist may get some new light on cardiospasm, pylorospasm, spasm of the gullet, and intestinal stasis; the urologist on the occasional cases of nocturia, frequent micturition, irritability of the bladder, and lack of nocturnal concentration of the urine, without physical basis in the genito-urinary tract. The internist ought to get some help in the treatment of bronchorrhoea, asthma, and high blood pressure, albuminuria without definite cause, and I believe will find that many of the cases now diagnosed as myocarditis are actually suffering instead from the condition under consideration. The dermatologist may get a new conception of some forms of dermatographia, urticaria, angio-neurotic oedema, pruritus, herpes zoster, seborrhoea sicca and oleosa and chloasma; the proctologist on fissures of the anus;

and the hematologist some new light on leukopenia and eosinophilia; and the neurologist on the various types of neuralgia, paralysis agitans, and pseudo-muscular hypertrophy; and the orthopedists on the various types of chronic joint affections and more particularly the digitori nodi of Heberden.

A CAUTION

While this condition is probably a good deal more prevalent than appendicitis, let us not fall into the error of calling every pain or every limitation of motion or every muscle spasm an evidence of Chronic Fatigue Intoxication. Let us rather profit by the errors of the recent past when every pain was looked upon as an evidence of focal infection and many sound teeth and many normal tonsils were sacrificed. And let us look for a sufficient number of unmistakable signs and symptoms before we make a diagnosis of this condition.

CHAPTER V

COMPLICATIONS AND SEQUELLAE

Since Chronic Fatigue Intoxication is as the name implies a chronic disease, it is frequently complicated by other diseases. It is not improbable that at some time or other it may be complicated by practically every disease to which man is subject and, as a matter of fact, in even the relatively small number of cases that I have examined and treated, I have actually come across quite a large number and variety of complications. In this study I have, however, been very forcibly impressed with the fact that a certain class of diseases have been unusually frequent complications, and the query has naturally suggested itself whether these diseases are really disease entities or whether they are merely symptoms, and whether some of them may not really be sequellae or terminal stages of the general disease here under consideration. Take the question of the symptom neuralgia for instance. This I believe is a symptom of many diseases and one of the most common symptoms in this disease. When it occurs as a result of focal infections it should be looked upon as a symptom of focal infection; when it occurs as the result of lead poisoning it is simply a symptom of that disease, and so on through the

whole category, all of which leads me to the natural conclusion that neuritis the counterpart of neuralgia is no more a disease entity than headache is, and hence should not be classed as a separate disease, but simply as a symptom occurring in a great variety of diseases.

While it is true that from a pathological standpoint we may be justified in speaking of neuritis as a disease and while it is also true that we have the term neuralgia as a symptom and while on superficial consideration it may seem unimportant whether we look upon neuritis and other conditions which I will shortly mention and briefly consider, as distinct diseases or simply symptoms, I am inclined to believe that a more clear-cut differentiation between what are diseases and what are symptoms should add to clarity in our understanding of disease processes, and to efficiency in our treatment of the sick. There was a time in the history of medicine when in the minds of most medical men oedema was considered a separate and distinct disease. A great stride forward was taken when it was realized that oedema was merely a symptom of a great variety of diseases, and the realization that a number of conditions which are now looked upon as disease entities are really only symptoms will bring us forward another step.

The longer I study this disease the more thoroughly do I become convinced that the following

enumerated so-called distinct diseases are only symptoms of a considerable variety of independent and entirely dissociated disorders, and rather common symptoms of the disease under consideration. Among these may be mentioned angina pectoris, tic convulsive, tic douloureux, sciatica, tri-facial neuralgia, brachial neuralgia, chloasma, urticaria, angioneurotic oedema, dermatographia, seborrhoea sicca, and oleosa, herpes zoster and herpes labialis, asthma, pseudo-muscular hypertrophy, high blood pressure, lumbago, acidosis, and paralysis agitans. In books on hematology we find the interesting statement that herpes zoster, urticaria and bronchial asthma are listed as diseases in which the patient practically always has eosinophilia. Whether this occurrence is simply a coincidence or whether it is an additional proof that these conditions are really only symptoms of Chronic Fatigue Intoxication is a matter worth considering. Heberden's nodes, I am inclined to think, occur only in this affection, are an integral part of it, and consequently really only a sequel and not a disease at all. The same I think can be said of writer's cramp and the so-called chronic muscular rheumatism. Paralysis agitans, angina pectoris, and acidosis I am inclined to believe are often merely terminal stages of this disease.

CHAPTER VI

PATHOLOGY

While numerous studies on the pathology of acute fatigue have been made, I am unable to find any detailed study on the pathology of chronic fatigue, and in reviewing the articles on acute fatigue I was impressed with the great diversity of opinion and the fact that hardly any two writers agree on even the essential points involved. About the only thing that these experimenters agree on, so far as I am able to determine, is that carbon dioxide and sarcolactic acid are present in the muscle substance of fatigued animals, while these substances are supposed to be lacking in completely rested muscles. This alone would not, however, explain the observations of Ranke and his followers who injected blood from fatigued animals into normal animals and found that the latter became fatigued. From his findings it would seem reasonable to conclude that fatigue products are formed during the exercise and find their way into the circulation, and that they are something more elusive and something in addition to sarcolactic acid and carbon dioxide.

The outstanding features of Chronic Fatigue Intoxication from a pathological standpoint are:

1. Changes in blood and blood vessels.
2. Deposits in subcutaneous areolar tissues and tendons.
3. Peculiar thickening of skin.
4. Trophic disturbances of the skin and its appendages and other structures.
5. Thickening of periarticular tissues.
6. Thickening of nerve trunks.
7. The always present muscle spasm.
8. The demonstrable relation between the various deposits and the symptoms.

That there must be changes in the blood vessels or in the circulating blood or both, is proved by the tendency to bruising, the ease with which ecchymotic spots are produced, which is so general in the moderately advanced and far advanced cases, and which tendency completely disappears as the patient becomes well; also by the little blood tumors observed on several occasions in conjunction with the superficial veins of the dartos. That there is a real demonstrable alteration in the blood itself is proved by the fact that in those cases where the coagulation time has been tested it has actually been found longer than normal, and by the further fact that in the more severe and long standing cases eosinophilia and leucopenia are practically always present.

The deposits so frequently described are usually symmetrically distributed over the two halves of

the body, and if they are very diffuse often closely simulate ordinary oedema. This pseudo-oedema may involve all the subcutaneous areolar tissues of the body including the face and hands, does not pit, is not affected by posture, and obliterates the normal contours and creases of the body. No effort has so far been made to ascertain either the histologic or chemical nature of these deposits, but that they are a part of this disease I am thoroughly convinced, as will be elucidated later.

Contrary to the distribution of the deposits in the subcutaneous tissues the deposits in the skin itself are usually asymmetrical. These areas of thickening can easily be outlined when the skin is carefully pinched up between the index finger and thumb. It varies in thickness from slightly above the normal to fully an inch. When moderately pinched it has a rather red, angry appearance, and with continued pinching it becomes white and shiny and glistening as though oil droplets were about to exude from it. This, in addition to the marked pigmentation and roughening of the skin which is so often found in these cases, makes a picture which when once carefully observed and studied will never be forgotten by the diagnostician.

One writer looks upon chloasma as evidence of sympathetic involvement, an opinion also commonly held in reference to angioneurotic oedema, and herpes labialis. The trophic disturbances of the

skin and other tissues, such as dryness of the skin and hair, striation of the finger nails first described by Fothergill, and ulcers and canker sores, makes one suspect that the trophic centers in the spine, or the nerve fibres supplying the areas affected are involved.

The best description of the joint involvement that I can give is the one already quoted from the original article by Heberden, to which I refer under symptomatology. In addition I would say that the larger joints also are often markedly swollen, but on careful examination it is easy to determine that the involvement consists of a thickening of the capsule, the ligaments, tendons, and skin without involvement of the joint cartilages, bone, or synovial membrane. That the joint involvement is not of a true inflammatory nature is very evident from its development and also from its mode of recession during recovery. It seems much more likely that this, too, is a trophic disturbance.

That the neuralgias so commonly found in this condition are unquestionably sometimes due to an œdema of the sensory nerve trunks, can easily be determined when the sciatic, external peroneal, and ulnar nerves are involved, because in these cases the actual thickening can be felt on palpation. On other occasions it would seem that the neuralgia is due to pressure on the nerves by deposits external to the nerve sheath. From this finding it is only

reasonable to conclude that the disturbances of the motor nerves are due to a similar oedema within the motor nerve trunks or to pressure from without upon the motor nerves.

Abnormal irritability of the skeletal muscles with muscle spasm is found in every case of true Chronic Fatigue Intoxication; and in practically every case of muscle spasm of the skeletal muscles, palpable deposits are found in either the tendon of origin or insertion, or both. Whether this muscle spasm is due to the reflex irritation by these deposits or whether due to irritation of the spinal centers by toxic material circulating in the blood, I am unable to say, but am inclined to the belief that both play an important role in its production; for if one of these deposits is stirred up temporarily the muscle becomes more spastic, as do also the remaining skeletal muscles. When, however, the deposit is thoroughly eradicated the spasticity of this muscle disappears unless other deposits are stirred up and more toxic material thrown into the circulation. S. Weir Mitchell is of the opinion that "Physical over-work wears out the spinal or motor centers." This may be true in the late stages but in the early and moderately advanced cases I am rather inclined to believe that the explanation which I have ventured is correct. That the true nature of muscular atrophy from over-use is also as yet not well un-

derstood is illustrated by the following observation of Gowers:

“We do not know whether this wasting from over-use is purely local or whether the related ganglion cells of the spinal cord fail first and the muscular wasting is secondary to their atrophy.”

That not only the voluntary muscles are in a state of super-tension but also the involuntary muscles seems evident from many of the symptoms already enumerated and also from the two cases of pylorospasm actually found at operation. I need but call attention to the frequency of spasm of the ciliary muscles of the eye so commonly found by refractionists, the rigidity of the pupil frequently observed in the later stages, the spasm of the tensor tympanii muscles, the sudden spasm of the intrinsic muscles of the larynx when the voice suddenly goes into high falsetto, the spasm of the bronchial muscles during attacks of bronchial asthma, the spasm of the bladder as illustrated by frequent micturition, in the day-time but particularly at night, the spasm of the gullet which frequently stimulates a true stricture, cardio-spasm and the increased peristalsis of both the large and small intestines.

In addition I am inclined to believe that the irregularity of the heart beat so often found in these cases, and the angina pectoris occasionally found, as well as the increase in high blood pressure

and vaso-motor spasm, are evidence of involvement of the intrinsic muscles of the circulatory system. The headaches I am also inclined to look upon as spasm of the cerebral vessels. That there is a definite difference between the high blood pressure of this pathological disease and of syphilis, for instance, I am inclined to believe, because, in so far as my experience goes, this form of high blood pressure is never accompanied by calcareous deposits in the vessel walls. That spasm of the involuntary muscles is due to a toxin circulating in the blood seems evident from the fact that all of these symptoms are aggravated by additional excessive exertion as well as by stirring up the deposits in the skin and subcutaneous areolar tissues.

It seems evident from a careful observation of the symptoms in a large number of cases studied that we are dealing here with two distinct and yet closely related pathological factors; namely, certain deposits in various portions of the body and a toxin or toxins circulating in the blood. With our present limited knowledge of normal blood chemistry, it is as yet impossible to determine just how this toxin is generated, what the chemistry of it is, and what the chemical changes are that occur in the tissues; but it would seem that this condition begins to develop the moment the production of the fatigue material exceeds the system's power of its elimination. Whether the toxin deposited is the ordinary

fatigue material generated under normal conditions, or whether it has a different chemical composition, can, of course, not be determined so long as we are not agreed as to what ordinary fatigue material actually is, and so long as neither toxin has been isolated. However, I believe it is safe to say that whatever the substance may be, it is generated in the body, and I am further inclined to believe that it is a protein product which either has not been completely changed into its terminal waste products, or has made further combinations in the process of metabolism. It would seem that the substance deposited in the skin, subcutaneous connective tissues, intermuscular septa, and tendons of origin and insertion is of a more stable, chemical composition than is ordinary fatigue material. This would have the advantage of preventing the organism from being actually overwhelmed with the toxin during periods of long continued and excessive exertion but the disadvantage of being more difficult of reabsorption and of ultimate elimination. Whatever the poisonous substance may be, it at first has an exhilarating, stimulating, and irritating effect upon all the nerve centers; while, if acting over a long period of time or in excessive amounts, it results in overstimulation and ultimate depression. That these deposits have a direct relation to the symptoms heretofore enumerated, we have ample clinical proof from the following facts:

that they are present in every case, showing this symptom complex; and that when these deposits are thoroughly eradicated and completely removed, all the symptoms will disappear; and from the further fact, that stirring up these deposits will temporarily aggravate both the local and general symptoms. Stirring up one little deposit will often cause the others to flare up; thus, the very thorough massage of one of them will make all of the others sensitive. Only recently I had a masseuse thoroughly massage a small deposit of this kind on the pectoralis major tendon, and within three hours all of the remaining deposits on the body became intensely sensitive and the Heberden's nodes, of which this patient had a goodly number became acutely inflamed, red, painful, and tender. One of my patients already referred to, twice after severe massage which consisted in stirring up a number of these deposits, developed complete suppression of the urine, each time lasting over twenty-four hours. On the other hand, in some instances it produces just the opposite effect. Quite a number of my patients find it impossible to remain in bed continuously even for the hour of the massage without getting up to void urine, the bladder becoming over-distended in this short interval. Many of them also complain of polyuria for twelve hours following a severe stirring up of these deposits; others complain of marked retinal exhaustion; again

others have their hay-fever-like and asthma-like symptoms markedly aggravated temporarily, the dryness and burning in the throat and gullet intensified; and those who suffer from hyperchlorhydria to a marked degree often complain of a large accumulation of very acid fluid in the stomach directly after a massage treatment, from which they can only get relief by vomiting or gastric lavage. Several of my more severe cases have reported that during a severe massage treatment, they have been taken with uncontrollable attacks of persistent yawning—rather conclusive evidence it seems to me that a considerable amount of fatigue material has been loosened from the tissues and suddenly forced into the circulation. Thus, any one of the dominant symptoms cited under symptomatology may temporarily be aggravated and permanently relieved by first stirring up and later removing these deposits; establishing beyond a reasonable doubt their intimate relationship to the general condition under consideration.

In some of the severer cases of sensory and motor involvement an actual thickening of the larger nerves can be ascertained by palpation; and whether the motor or sensory symptoms predominate depends upon the fact, as to which type of nerves are thus swollen or pressed upon by the deposits located in the surrounding tissues. Whether the motor and sensory or the vaso-motor and emo-

tional functions are mostly impaired, depends upon whether the swelling of the nerves and the abnormal deposits about them is the preponderant pathological condition, or whether the toxic material circulating in the blood is the most prominent feature in the individual case. These symptoms change noticeably as one or the other type becomes dominant from time to time.

The person who assumes that just because, so far, chemistry has failed to isolate a definite chemical toxin in the blood or in the tissues of the body, that therefore there is no change from the normal, must remember that he is depending entirely upon negative evidence, and we all know of how relatively small value this kind of evidence is.

The diphtheria bacilli were in the throat of diphtheria patients long before bacteriologists possessed either the knowledge or the means of finding them. We have never been able to isolate the germs of smallpox and yet we are morally certain that they are present in each and every case of this disease. When physiological chemistry will have made further strides, I believe it will be possible to isolate a specific toxin in cases of acute fatigue and a slightly different toxin in cases of chronic fatigue, and possibly still a slightly different chemical substance in the deposits so frequently referred to, though this latter may be identical with the toxin circulating in the blood in chronic fatigue.

CHAPTER VII

PROGNOSIS

Untreated the prognosis is always bad even in the mildest cases, because the disease is not a self-limited one; and while the milder cases will not get worse when the excessive stress is discontinued it must be remembered that the patient suffering from this affection, no matter how slightly, has by that very fact reduced his power of endurance, and exertion that would have been within the limit of safety before acquiring the disease now produces fatigue material in excess of the system's ability to eliminate spontaneously.

When properly treated, the prognosis depends in large measure upon the chronicity of the affection, the severity of the disease, and the number and severity of the sequelae and complications and not nearly so much upon the severity of the subjective symptoms. Thus a person whose disease is still in the labile stage may suffer a great deal and be thoroughly miserable and yet respond relatively quickly to appropriate treatment, while a person in the more advanced and even the terminal stages may have his senses so blunted that the affection, while causing discomfort, may be accompanied with relatively little acute pain. Hence, if there are

relatively few objective signs, even though the suffering may be great, the condition will respond much more rapidly than if the objective signs are numerous and well developed. If there is generalized muscle spasm, if the skin is markedly thickened over many portions of the body, if there is pronounced chloasma and much pigmentation and numerous areas of chronic angioneurotic oedema, if there are many deposits in the tendons and in the subcutaneous areolar tissue, if there are any Heberden's nodes and if there is pronounced eosinophilia, we may look for a slow and tedious recovery, often taxing the patience of the physician and the faith of the patient to the utmost. Yet even in the most stubborn cases it is surprising how few of those who persist in the treatment faithfully for the first month stop treatment before recovery is complete. For from almost the very first they are able themselves to notice certain changes for the better, and however slow the process of recovery may be they do see distinct improvement and almost invariably persist in the treatment until the recovery is complete. Many of these patients have made the following observation—"My condition is improving in the reverse order in which it developed. So and so long ago I had about the symptoms that I now have." As deposit after deposit is removed they notice the change, and while for a time after treatment is first instituted they often actually suffer

more, they do notice some of their symptoms disappearing and this encourages them greatly.

The more chronic the case the slower the recovery, and it may almost be said that the time required for complete recovery is in direct ratio to the time the condition has been developing. Thus a patient who has been ill a relatively short time and who complains of many of the subjective symptoms previously enumerated, will recover much more quickly than one who has been accumulating fatigue material for many years and who has become thoroughly saturated with it. If the case is complicated with some other disease the situation becomes much more serious and is difficult to handle in proportion to the seriousness of the complication and the degree of the advancement of the disease itself. If the case is complicated by degenerative changes in the heart muscles, arteries, kidneys, or other vital organs, or if there is marked increase in the blood pressure the prognosis is relatively bad. When the exhaustion becomes so severe, or the limitation of motion so great, that the patient can no longer masticate his food properly, and deep regular breathing becomes impossible, and nutrition fails, the case, of course, becomes practically hopeless. However, it has been a constant surprise to me how some of the seemingly hopeless cases have made complete recoveries. Time and again I have had a patient come into my office

after an absence of possibly six months and announce to me as he entered that if anyone had told him two or three years previously that he would ever again have the sense of well-being, the power of endurance, and the pep, buoyancy, and good health that he now possesses, he would have considered such a statement absolutely unbelievable.

CHAPTER VIII

PROPHYLAXIS

The young and inexperienced encounter many pitfalls during their journey through life. To help some of these wayfarers to avoid developing this condition is the main purpose of this chapter. The overwhelming majority of persons never move fast enough, work strenuously enough, or even play hard enough, to expose themselves in the slightest degree to the danger of acquiring this affection, and what follows in this chapter is not intended for them. Instead it is meant for the rather unusual person, the one of the grand total potentially most valuable to society, who often invalids himself during middle life or goes down to premature senility long before his time. Thus he often robs himself of much of the joy of living to which he is justly entitled, and deprives those nearest and dearest to him as well as society in general of much valuable service which he might otherwise render. If the ambitious youth and maiden, during or before their period of adolescence, can be taught to desist from all things evil and to learn the full meaning of the word "moderation," without becoming slovenly, shiftless, or lazy, they will live longer, accomplish more, and enjoy life better than if they indulge in too strenuous

work for long periods of time during this susceptible period of growth and development. Above all things at any period of life, but particularly during adolescence, it is very desirable to avoid excessive speeding up, to go beyond one's normal gait for any considerable length of time. Hence, I would caution particularly pace-makers to be careful not to go beyond their strength, to give some thought to their own health when they are trying to make a record, and to have some consideration for the health and well-being of those who in their effort to keep up with them often sustain permanent injury.

The person with a physical handicap should be particularly careful. If with such a handicap he tries for long periods of time to compete with normal individuals in a line of work where his handicap is a great hindrance, he is almost sure sooner or later to acquire this affection. An individual with physical defects of one or both of his lower extremities should avoid an occupation requiring much walking or standing and should learn a trade where he can sit much of the time, and the man with a physical defect of his hands or arms should train for a trade where walking comes much into play. A man with defective vision should avoid near work, and so on through the whole category. The very first thing a man with a handicap should do is to make every reasonable effort to be relieved of

it and if this is impossible he should choose a vocation where the handicap will interfere as little as possible.

Among the things to be avoided are hard physical work or undue excitement, particularly anger, when too tired. The experiments with the two horses and crate of cockerels described in the chapter on animal experiments give much food for thought and ought to furnish valuable lessons to the human animal, particularly emphasizing the desirability of not doing hard work directly after a heavy meal. Industry ought to be so organized that every individual would have an opportunity to take a little rest immediately after eating to properly start digestion. The suggestion made by Franklin many years ago, that the day should be divided into three periods of eight hours each, eight hours of intensive application to work, eight hours for meals, rest and recreation, and eight hours for sleep, is as good today as the day it was given and if generally followed would save the human race from many of the ills to which it is today subject.

Several years ago I had occasion to take a night trip with a man prominent in the business and industrial life of our city who, though not my patient, was very plainly suffering from this condition. In a short conversation before we retired to our berths the gentleman remarked to me that he wished that his nervous system were provided with

a switch like his study lamp, so that he could turn it off when he retired. He said that it had become quite impossible for him to go to sleep without a sedative. I naturally was solicitous about his condition, but as he was not my patient I could not offer my services and could do nothing for him. About a year later the daily papers contained the announcement of his untimely death. The gentleman had on a previous occasion told me that he started life as a coal miner, working twelve hours a day, that after his day's work he would sit up until three or four in the morning, studying first the elementary branches and later higher mathematics, political economy, languages, and philosophy. He had become in time one of the most learned men it has ever been my pleasure to meet, a captain of industry, a power in the community, but who had to pass on at the age of fifty-eight because he had failed to observe certain fundamental hygienic laws, because he had failed to realize until it was too late that "The bow that is always bent is sure to break," and as a consequence he could no longer secure repose or turn the switch.

In the selecting of a professional or business partner, in the employing of employees or in the taking up of a responsible position, much can be done to avoid being exposed to conditions which might ultimately lead to this affection, either for one's self or for one's employees. If an active, alert, am-

bitious, conscientious young man of ability with a short-time reaction coefficient is thinking of taking in a partner who is to be intimately associated with himself in daily work in the same activities or department, he should take great care that the partner be equally alert, active, ambitious, and conscientious, and of equal or nearly equal ability and similar time reaction coefficient, otherwise the one with the short time reaction coefficient is almost sure to not only do his own work but rather than wait for the slower one to take hold, do most of his work also. In choosing employees for a certain department who are to work on an even or nearly even basis, it is very desirable to select them all of equal or nearly equal ability, earnestness, and time reaction and to constantly weed out the laggards in order that the best may not be over-worked. The piling of work on the willing worker, which is almost sure to follow if the above rule is not observed, is not only unwise and unprofitable in the long run, but shamefully unjust and unfair.

The young, alert, ambitious, active, conscientious man with ability should be very careful what kind of an employer he chooses, and if he gets the wrong kind he should not wear himself out but get another position before the mischief is done, if necessary even at a lower salary. If the employer or manager of the department is irritable, cross, nagging, fault finding, unsystematic, and has a ten-

dency to let the lazy, shiftless co-workers slip out of doing their full duty and if he has the tendency of piling more and more of the work on the willing, ambitious ones he is a man with poor judgment, or the job is too big for his ability, and disaster is sure sooner or later to overcome him or his department or business, and it is better to leave him before the mischief is done than after the crash comes.

To the ambitious young business or professional man I would say, do not throw your reserve strength into your business, do not run on your second or third wind, unless it is absolutely necessary. The individual who is running on his reserve strength continually is in as much danger of defeat and annihilation as is the general who is always throwing in his reserves. There are unquestionably times in most men's lives when it is absolutely necessary to throw in every ounce of strength that the individual possesses just as there may arise occasions in a great and decisive battle when it may be necessary to throw in the last man, but after all such occasions occur only rarely, and the wise man as well as the wise general uses his last reserves only in extreme emergency and when all is at stake.

One of the great problems is to learn how to conserve one's energy. Time and energy should never be frittered away. Another is to cultivate repose, another is to practice moderation, and two

good questions to ask one's self occasionally are: "Can you unstring yourself?" "Can you turn the switch?" Another fairly good test as to whether the individual is overdoing or not is to observe his condition on arising in the morning. The person who habitually gets up feeling stiff in his various joints and muscles, with a bad taste in his mouth and who feels the need of a bracer, either of a hot bath, whiskey, or hot coffee before he can limber up, is in a fair way of acquiring this affection. "The man who keeps well is the man who never accumulates fatigue. He balances his accounts each night or each Sunday and never runs in debt. The rested body can digest and assimilate, can secrete and excrete. The good of exercise is perfected in rest."*

The above sums up the situation very clearly and concretely. I would simply elaborate it a little by saying that the over-fatigued body cannot digest and assimilate properly, cannot secrete and excrete properly, with the result that a vicious circle is established which it is very difficult to break.

The excessive consumption of highly nitrogenous foods or foods very rich in fats and cane sugar should be avoided. Hard work after a severe illness, major surgical operation, during pregnancy and after confinement or after excessive loss of sleep or blood are to be avoided, as should be over-heated, badly ventilated living places and workshops. If

* Reprinted from *The Old Dominion Journal of Medicine and Surgery*, Vol. IX, No. 5, November, 1909.

these things are carefully avoided an individual can do a very large amount of work in the course of an ordinary life-time without running any risk of being incapacitated by this affection. If, however, these precautions are not observed much harm may be done. What would anyone with ordinary common sense think of a railroad engineer who would bolt down the safety valve on his engine, set two firemen shoveling coal into the firebox, open all the drafts, grit his teeth, shut his eyes, throw the throttle wide open and tear down the track heedless of crossings, switches, danger signals, and all? One would probably justly conclude that he had gone stark mad and if the division superintendent's attention were called to his reckless act, it would probably be the last trip that that engineer would have a chance to run on that or any other road. And yet as likely as not the president of that same railroad is doing the very same thing with his own human engine almost every day. If he comes through all right one year, he just bolts down the safety valve a little tighter, shovels in a little more fuel in the shape of highly concentrated nitrogenous foods, adds alcoholic beverages, coffee, and tobacco, and courses down the not all too merry skids to sure destruction.

When I hear of a professional or business man referred to as "indefatigable," "that he just eats work," then see that that same man is restless,

irritable, nervous, either looks like a man who has just come out of a severe illness, or shows the first symptom of paralysis agitans, or is suddenly getting stout, sallow, and sub-icteric with the skin of his face thrown into thick folds which makes him look heavy and unintelligent, more like a saloon keeper or ward heeler than a professional man or captain of industry, there keeps running through my ears the jingle of James Whitcomb Riley "The goblins will get you if you don't look out."

The quitter and the one who does not know when to stop represent two extremes. The former usually lacks self-reliance and often is just plain lazy. The latter usually is too ambitious and only too often lacks good judgment. In life as in automobiling it is important to know when to go ahead, but often more important to know when to slow down or even to come to a dead stop.

CHAPTER IX

ANIMAL EXPERIMENTS

The same symptoms as those outlined under symptomatology are frequently observed in horses. On a number of occasions I have seen them develop in the ordinary course of work, and several years ago I deliberately produced the same condition in two horses, the history of one of which I will here give in detail: A thoroughbred Kentucky saddle horse went bad, that is, developed a severely incapacitating spavin of the right hind leg which made him unsuitable for further city use. I sent him to my farm with the deliberate purpose of seeing what overwork would do in order that I might study the development of this condition in all its stages. He was a slender, intelligent, spirited, willing, gentle, well-trained animal with an excellent disposition, handicapped by the spavin as before mentioned. I worked him with a slightly heavier, quiet, intelligent, willing, well-dispositioned Hameltonian driving horse, also somewhat spirited, but evidently of a slightly longer time reaction. At first they worked very well together, but the handicap of under-weight and lameness soon began to tell on the Kentucky horse. While at first both of them responded simultaneously and with the same time

reaction to the cluck of the driver, in a sort time the Kentucky horse responded much quicker to this cluck and after another month or so he would start at a cluck that was so low that the other horse did not appear to hear it, illustrating plainly that the Kentucky horse's hearing was becoming very acute, his time reaction short, and that he was becoming very irritable. This test I actually made myself time without number. In addition it was evident that he was becoming more and more nervous, fearful, fretful, skittish, and shy. If his mate was being urged, in a drive of several miles, the Kentucky horse would become very nervous, his eyes glistening, glassy, and bloodshot, plunge along headlong, and work himself into a lather. After a time he began to eat poorly and had attacks of diarrhoea; a veterinarian whom I consulted without telling him what I was doing, after examining the horse expressed it as his opinion that the animal was suffering from hyperacidity of the stomach. On asking him how he reached his diagnosis, he told me that the acid condition of the stomach was easily determined by smelling of the horse's breath and this I was myself able to readily confirm. In the meantime the horse had lost considerable flesh. I now purposely eased up on him and after several months of relative rest, the symptoms disappeared, the horse became quiet, gentle, plump, and spirited instead of fiery. I now repeated my experiments

with the overwork and overstress and the horse soon lapsed into the condition previously described, and this in a much shorter time and with much less overwork than the first time. This time instead of letting up on him I continued with the overwork. He soon reached the high point of his irritability and in a few months more the second stage of his disease began to manifest itself. He became stiff in his joints, listless, slow to react to external stimuli, could scarcely be made to go beyond a slow walk with ordinary urging and even with the whip would make a spurt of only a few rods. In a short time he developed a jerky, spasmodic respiration known as heaves, short hacking cough, marked flatulence, and constipation.

In my experience as a practical farmer I have had a number of other interesting experiences. On three different occasions I have seen young, perfectly well and strong horses develop heaves after a particularly hard drive on a full stomach on a sultry day, and it was these experiences that first led me to observe the similarity between the human individual who is suffering from Chronic Fatigue Intoxication and the horse that has been overworked for a long time, and later led me to make the two experiments, one of which is given in detail. If the overwork has not been pushed too far, is then interrupted, most horses will make a fair recovery with proper rest, and even if the overwork

has continued for a long period rest and proper feed will make such a horse look quite fat and plump, and to him who is not thoroughly familiar with horses such a horse may look as good as ever. However, the knowing horseman can always recognize the condition even if veneered over by a period of rest and good grooming. Such a horse will always remain lazy, not from volition but simply because it is chronically tired and has neither the energy nor the nimbleness to go more than so fast. If, however, the process of overwork goes still further, the horse becomes very thin, in fact nothing but a bag of bones, can never be made to take on fat, becomes emaciated, and usually dies, apparently from some intercurrent affection, but actually from long continued overwork.

This condition has long been recognized by veterinarians and horse dealers and all who have much to do with horses; in fact no horse dealer, or even farmer who uses many horses, could prosper who does not recognize the condition at a glance. It is one of the diseases to which horses are liable which he recognizes almost intuitively.

Horse jockies who deal in old worn-out horses also have a method of treating them and staving off death until they can again dispose of them. Some years ago I went to a sales-barn of one of these horse dealers to buy a farm horse. Of some fifty horses which he had for sale, all but two were

suffering from this condition. My experience with horses led me to recognize it instantly in every horse brought out for inspection and after I had turned down half a dozen and the man saw that I would not buy a horse of this type, he became communicative and told me all about his business. He told me that he bought horses of this type almost daily. So long as they were still plump and had not reached the stage of emaciation he would purchase them, doctor them up, and after a week or two dispose of them again, often at considerable profit. He further stated that if he was able to get from a pint to a quart of castor oil down such a horse for three consecutive days he was usually able to save the horse, temporarily at least. It is evident that the heroic doses of castor oil resulted in the elimination of considerable fatigue material and gave the horses a new lease on life.

Domestic animals with the exception of the horse, which in this regard has evidently been demoralized by man, are protected by their instinct against the taking of violent exercise after a full meal or eating when excessively tired. After a full meal their normal instinct is to find a secluded quiet spot where the processes of digestion and assimilation can go on undisturbed; also after excessive fatigue they will not eat until they have had a short period of rest. Several years ago I made an experiment on a crate of cockerels that had been in transit for

over twenty-four hours and had not had a particle of food for forty-three hours. They were empty and hungry and yet the most delicious morsels, from a chicken's standpoint, did not tempt them to take a mouthful of food until they had had time to rest thoroughly, quench their thirst, and eliminate the accumulated fatigue material.

To me these experiments and observations on the horse and other domestic animals have been most illuminating and have helped me to clear up a number of important points in the symptomatology, diagnosis, and treatment, and should also furnish a valuable object lesson in prophylaxis.

CHAPTER X

TREATMENT

In the treatment of patients suffering from this affection, four objects must constantly be kept in mind.

1. Maintain or improve the nutrition of the patient as the individual case may demand.

2. Prevent the further accumulation of fatigue material.

3. Ameliorate the symptoms as much as possible.

4. Remove the already accumulated fatigue material.

While I will not take these points up categorically because this does not seem convenient or feasible, all the suggestions made are for the purpose of accomplishing these four objects.

In the early cases little difficulty will be encountered in maintaining good nutrition, if one will simply see to it that the patient has a diet in which the necessary ingredients of proteids, hydrocarbons, carbohydrates, salts, and vitamins are properly proportioned, the variety is sufficient, the food is prepared so it will be easily digestible, and attractively served, so that the patient's appetite will be maintained. In the more advanced cases the problem is a good deal more difficult. Here the nutrition has

often grievously suffered, the gastric and intestinal juices have been much altered, the patient often is so exhausted that he finds it difficult to properly masticate his food. This exhaustion may reach such an extreme degree that some of the patients actually find it a hardship to eat. I have watched some of them eat and recall one patient in particular who just opened her mouth, put the food in, swallowed it whole just as a chicken or young crow eats. Not being supplied with a crop and a gizzard much of the food naturally went through entirely undigested and acted principally as an intestinal irritant. In such cases it may actually become necessary to pass all food through a meat chopper before it is served.

Nearly all of the severe cases suffer much from hyperchlorhydria, eructation and belching of gas, and constipation. One of the most important matters in the dietary is to prohibit the ingestion of such liquids as tea, coffee, alcoholic beverages and water with the food, in order that the gastric juice may not be too much diluted and then, too, the gastric distress is markedly lessened. The hyperchlorhydria must be overcome by the judicious use of the various antacids. In one individual one antacid works best, in the other another, and if the first one does not give the desired result, others must be tried out until the right one is found. The antacids will also assist somewhat in overcoming the pyloro-spasm and the cardio-spasm, the latter of

which is probably the chief cause of the eructation and belching, as it prevents the normal escape of swallowed air. The pyloro-spasm is in part unquestionably caused by the attempt of the pylorus to hold back the excessively acid stomach contents. In addition the antacids help to overcome the reduction in alkalinity of the blood, and ameliorate to a considerable degree the nervous irritability from which so many of these patients suffer.

Because of the pyloro-spasm the emptying time of the stomach is often greatly delayed, and then most careful attention must be paid to the feeding interval, for the taking of a new meal when the previous meal is still in the stomach is likely to still further derange the digestion and cause the formation of toxins in the gastro-intestinal tract. As a rule I find that these patients do best on three meals a day and that few of them can safely take food oftener than that in the twenty-four hours. On quite a number of occasions I have found it necessary to cut them down to two meals a day and on a few occasions temporarily to one.

In addition I have every reason to believe that the toxic substance deposited in the tissues, and so often circulating in the blood, is a protein substance and not until I realized and recognized this fact and eliminated practically all animal proteids except milk, cream, and butter from the dietary of these patients, did I begin to get results. Hence I pro-

hibit the use of all meats including fish and sea food, meat soups, meat gravies and eggs, though eggs in moderation in the cookery seem to be tolerated fairly well.

As many of these patients, particularly in the later stages, suffer from severe chronic constipation, it is well to see that they have enough roughage in their diet such as cereals, carrots, onions, egg plant, squash, parsnips, string beans, tomatoes, mushrooms, stewed fruit, spinach, green peas, lettuce, celery, coldslaw, etc. Cooked cabbage must be avoided as it is difficult for these patients to digest and is apt to cause a great deal of gas. Coldslaw on the contrary is very well tolerated by most of them.

Many and various disturbing symptoms appear from time to time during the course of treatment and these call for much ingenuity in their successful handling. Two of the most difficult ones to deal with are pain and insomnia, but they can usually be successfully met without the use of opiates and hypnotics and every effort must be made, if the case is to terminate in a cure, to get along without the use of opium or any of its derivatives. To relieve the distressing symptoms during the time that the accumulated fatigue material is being eliminated is of the utmost importance, for if the former is not done effectually the latter is almost impossible of accomplishment because pain and dis-

comfort are two of the most important factors in the further production of fatigue material.

One of the most distressing of these symptoms is cold feet, naturally more in evidence during the winter months. I have had a number of patients describe it not as discomfort but as actually almost unbearable pain during their waking hours, and so annoying and distressing at night as to rob them of hours and hours of sleep. In these cases bed socks alone are of relatively little value. If, however, the feet and legs are rubbed for five minutes using a mixture of two drams of tincture of cantharides added to one pint of 50% alcohol and the bed socks are then worn, the patient will be entirely relieved for the night and if comfortably warm and dry footwear is worn in the daytime they will be soon entirely relieved of this discomfort.

To look after the discomforts and to relieve them as much as possible is very important, but it is even more essential to see to it that no new fatigue material is deposited. One of the most widely applicable and I would say most neglected of all therapeutic agents which we possess is rest and in this disease particularly do we need to employ it. In the less severe cases the ordinary vocation, unless too strenuous, can be continued, but the patient should be advised to take as much rest as possible when not actually at work and to pursue his work with moderation. In these cases an occasional

fifteen minutes of absolute relaxation with the patient lying perfectly flat, feet and arms outstretched and relaxed, is of great assistance. The value of this was well understood by Gen. Stonewall Jackson, who used it with marked success in his army. Of all the generals of all times he had probably the most mobile army that ever existed in the history of the world. It was so mobile that the Northern generals never knew where he would strike next and greatly over-estimated its numerical strength, and he accomplished it by making use of the following tricks: During forced marches he would every few hours direct his soldiers to stretch themselves out perfectly flat on the ground and with all of their muscles relaxed remain in this position for ten or fifteen minutes.

A common mistake sometimes made by the attending physician, more often by the patient, and still more often by the kind relatives and friends, is to try to find relief for this condition in change of occupation. Many times patients have come to me where such attempts have been made, and always with dismal failure. Many times I have had friends of patients say to me—"Can we not secure a change of occupation so the patient will get his mind off his troubles." This very day as I am writing this a friend of a patient asked this very question. The patient for whom this advice was asked, a woman fifty-nine years of age, is in the

habit of constantly repeating her ailments to a friend and rehashing all of the troubles she has gone through in her lifetime, and the friend, an intelligent woman, suggested getting some work for her so that she would be able to forget her troubles. The fact is that this particular patient has for the greater portion of the last forty-five years been continuously, shamefully over-worked. She was the oldest of seven children. Her father was a habitual drunkard who did little in the way of providing for the family; consequently this burden fell upon her at the age of fourteen years, when she virtually assumed the duties of breadwinner for the family until they were all grown up. Then for some twenty years she supported and cared for her invalid mother. The trouble is that she is absolutely worn out, and what she needs is not more or different work but absolute rest. I have made the interesting observation in many of these cases that just as soon as the chronic fatigue material is removed from the body they stop their introspection and become perfectly normal individuals. I have had some of these patients who had tried a number of different occupations, who had traveled from health resort to health resort without getting a particle of relief, get perfectly well when the fatigue material was finally removed. Nothing could be more unsatisfactory than to attempt to treat these people the same way that neurologists

treat hypoplastics, constitutional inferiors and patients suffering from functional neuroses. The two conditions are as far apart as the antipodes and must be treated along entirely different lines if we would succeed in any considerable percent of these cases.

Because of the slow, oftentimes unreliable thinking processes and impaired judgment as well as their inability to adjust themselves readily to new conditions and environment, these patients should be strongly urged not to change their occupation or to go into new important ventures. This observation is made because so many of these patients become dissatisfied and restless, constantly have a longing to try new things with the hope of getting relief in some distant part of the world, and are often advised by their physicians and others to change their occupation. This usually does the patient more harm than good and practically always leads to financial losses and sometimes to financial disaster. I have seen a number of these worn-out city folk buy chicken farms, truck farms, and general farms, try it for two or three years, lose most of their money, and return to the city utterly broken in spirit and in purse. I have seen overworked farmers sell their farms, go into business in the city with the same unfortunate end result. The paths of least resistance are the ones which have been most traveled. If these people must work,

they will find it easier and less exhausting to follow along the beaten path. They will do best to continue right on in their familiar haunts and occupations and not make new ventures or try to learn new trades. Even the much advised change of scenery and travel is of no permanent value. I have a number of these patients who have traveled from sanitarium to sanitarium, and from country to country without the slightest relief, who were permanently cured when placed on proper treatment right in their own home.

In the more severe cases it is sometimes necessary to have the patient stop his work entirely and to interdict physical exercise of all kinds. The physical exercise stunts that so many of these patients are put through must all be stopped if a cure is to be accomplished, because instead of eliminating fatigue material they cause the further production and accumulation of it. In the very extreme cases it may actually be necessary to temporarily put the patient to bed and even to feed him in order to prevent the further production of fatigue material. This is imperative in all cases of Chronic Fatigue Intoxication suffering from high blood pressure.

In the feeding of these cases it is sometimes even necessary to see that the patient does not ingest too much food, for some of them have unnatural, ravenous appetites due to the hyperacidity of the

stomach, and the elimination of the excess food ingested actually produces new fatigue material.

One of the important things in preventing accumulation of new fatigue material is to help the patient get rid as nearly as possible of all handicaps; thus the patient with uncorrected hypermetropia, myopia, and astigmatism, should be tested out most carefully and proper glasses fitted in order that he may not be continuously subjected to exhausting eye strain. Ankylosed joints should be limbered up if possible, deformed joints should be straightened and made useful, and all bodily defects that can be relieved should be relieved as soon as possible. The unusually tall man should be given suitable tools and all unnecessary stress should be done away with.

Proper diet, rest, and looking after the symptoms as they arise, sometimes make these patients more comfortable, but these alone will never cure them. Sometimes again they are actually made more uncomfortable and unhappy by these procedures alone, because the forced idleness gives them more time to think about their pains and discomforts. Removing the cause alone may actually lengthen life but sometimes it makes it even more intolerable. This and attempting to relieve the symptoms as they arise from time to time is not sufficient to effect a cure. And if this course alone is relied upon, the patient soon drifts from one physician to

another, then from one quack to another, until he gives up in despair, or is finally relieved from his suffering by a premature death due to an intercurrent affection or suicide. In order to forestall these undesirable endings we must devise means by which the already accumulated fatigue material can be removed from the body. Various measures must be employed to accomplish this. The active treatment should have for its object the elimination of all accumulated fatigue material in the shortest possible time with the least risk and discomfort to the patient.

Good air, both day and night, is absolutely essential in order that the products of fatigue may be properly oxidized and converted into a form which may be easily eliminated. Suitable baths are also valuable adjuncts. The baths which I have found the most beneficial are sponge baths every morning at a temperature varying from 68 to 72 degrees F. according to the temperature of the room. Three weekly tub baths at a temperature of 93 degrees F. and in extreme cases, particularly where the vasomotor disturbances are pronounced, a Sitz bath at 95 degrees F. with a shower at 80 degrees F. simultaneously for a period of five minutes every evening before dinner.

In the extreme cases the use of castor oil is very important. Some of the most severely afflicted patients can be saved only if they are given one

ounce of castor oil every evening on retiring or the first thing in the morning, in order that the end results of the faulty digestion may be removed from the gastro-intestinal tract daily and the fatigue material which may have found its way into the gastro-intestinal tract after massage may be eliminated before it is reabsorbed. Some ten years ago I discovered that horse dealers make use of this same remedy. This point is more fully considered in the chapter on "Animal Experiments."

In order that the ever present and fearfully exhausting muscle spasm be relieved, we must actually dislodge the already accumulated fatigue material located in the deposits so frequently described, so that the patient may again relax his muscles. The bow that is always bent is sure to break. We must loosen the strings or the patient cannot get well. And in order to dislodge this fatigue material from the tissues and to permanently rid the system of it, the measures already mentioned must be supplemented by carefully supervised, intelligent massage. Not only must massage be supervised but even the best masseurs must be painstakingly taught the fundamental principles involved in order that they may intelligently follow the directions prescribed in each individual case. It is for this reason that in the chapter on "Symptomatology" I have gone into considerable detail as to the most common locations of the fatigue spots in order that the

physician in charge may look for these in each individual case, then direct the masseur in detail how to treat each individual patient. I have on numerous occasions had patients come and tell me that they have had weeks and months of massage treatment without a particle of relief, who were promptly relieved of their trouble when they received the right kind of massage, and when the other points above enumerated were attended to.

When the patient is completely relieved of all of the symptoms and of all of his fatigue spots, the time for physical exercise and physical re-education of the atrophied muscles has arrived. Now this remedy is indicated and of great benefit, but if used too early it is distinctly harmful. The exercises must be gradually increased, always stopping short of exhaustion. For this purpose I have found the booklet which I published some years ago entitled *Physical Exercise for Invalids and Convalescents* of great assistance and convenience, because the exercises therein outlined are very simple and the dosage can be very carefully regulated. Later more strenuous exercise such as golf, tennis, walking, rowing are indicated and moderate fatigue encouraged, but exhaustion guarded against in order that a relapse may be averted.

CHAPTER XI

CONCLUSIONS

To teach a person to disregard minor bodily discomforts and to bear with equanimity unavoidable pain is a real service. To encourage him to disregard preventable pain is often a positive injury. To make a person unmindful of pain, to deny the existence of a definite ailment which does in fact exist, and to disregard the evident symptoms, is not by any means curing him of his malady. These are often even poorer makeshifts than a narcotic. The advice so universally given these poor sufferers by Christian Scientists, psychotherapists and, I am sorry to say, sometimes even by regular physicians, to disregard their pain, is about as illogical and absurd as to advise a householder to disregard the smell of smoke from the basement where normally there should be no fire, or to disregard the sounds caused by the jimmying of a downstairs window by a burglar. There may, of course, be times when it is prudent to disregard the burglar and there may be times when it may be absolutely necessary to disregard pain, but such occasions surely must be rare. There is a vast difference, however, between on the one hand neglecting to pay attention to the smell of smoke from the basement, the noise of the

jimmy of the burglar, and the pain of this affection, and on the other, lying awake nights smelling for smoke, and listening for the burglar and pinching one's self every few minutes to look for pain. Both extremes should be avoided as they are equally irrational and harmful. I cannot see any fundamental difference between the Christian Science healer who denies pain and the psychotherapist and regular physician who disregard pain, or the former when he reads some meaningless jargon to his dupe and the latter when they say "Forget it" to their patients. While it is bad to magnify every little ailment it is stupid to disregard actual pain. Pain is a warning signal which can be no more safely permanently disregarded by the individual than can the red danger signal be safely disregarded by the railway engineer. As children we learned to keep our hands out of fire, to avoid falling downstairs, or cutting ourselves because it hurts. As adults we are provided with similar safeguards. The process of self-hypnotization and auto-suggestion so commonly indulged in nowadays by many individuals who pretend to be well when in fact they are thoroughly miserable is of very doubtful value. "What can't be cured must be endured," like most epigrams, expresses only half the truth. The other half of the truth is, What can be cured should not long be endured.

The time has now arrived when these sufferers can be relieved and hence should be relieved and thereby greatly reduce suffering and correspondingly increase human happiness and efficiency.

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